文書　No. オMCPG1G1-3920E

要 領 書/Manual

ユニット　名称: SUPER TURBO－X MkIII 据付要領書

Unit Name: Installation procedure for SUPER TURBO－X MkIII

機　　種: SUPER TURBO - X MkIII

Model: SUPER TURBO - X MkIII

仕 向 地: ALL

この説明書は改善のため予告無く変更されることがあります。
This manual is subjects to revise for the improvement without any notice.

ヤマザキマザックオプトニクス技術グループ
YAMAZAKI MAZAK OPTONICS ENG. DEP.

No.4	
No.3	
No.2	
No.1	

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Director	G／L	G／L	担当者/Charge	担当者/Charge
	オプト技術 河井 '10.06.22			レーザーP 寺島 '10.06.21

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SAFETY PRECAUTIONS

This manual is prepared only for the function specified in the title of this manual. Therefore, you are requested to carefully read and understand the operating manual of this machine, especially the section describing the SAFETY PRECAUTIONS, before using or operating the function or the device.

1 SLINGING A LASER MACHINE

1-1 Slinging by Crane

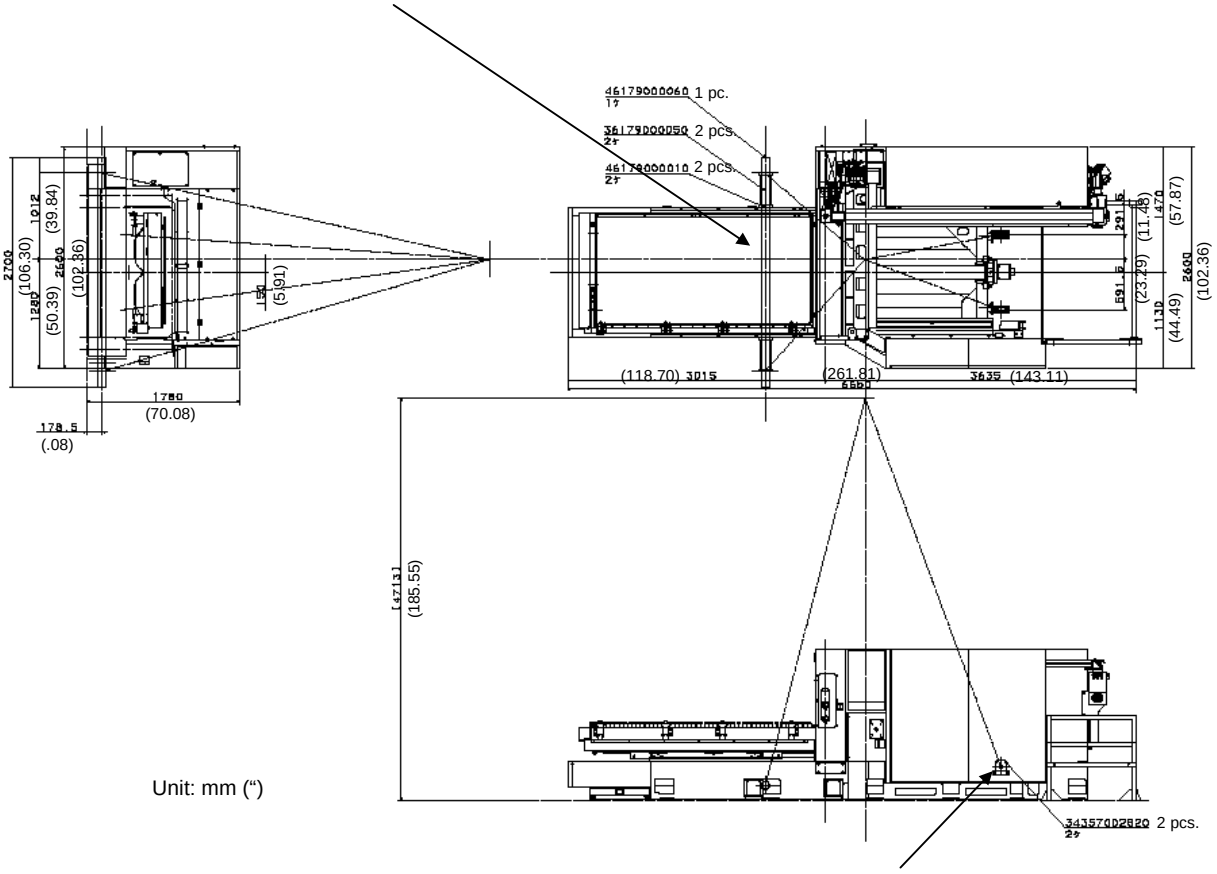
Front side of machine: Mount slinging brackets on the base to sling the machine with wires.

Pipe: 46179000060 (1 piece)

Fixture: 36179000050 (2 pieces)

Fixture: 46239000010 (2 pieces)

Wires: 5 m (5.5 yd.) x 2 [ϕ20 mm (0.79”) or more]



Unit: mm (“)

Back side of machine: Sling the machine with wires from the slinging brackets on the base.

Use a chain to adjust the length.

Wires: 4 m (4.4 yd.) x 2 [ϕ20 mm (0.79”) or more]
(Use shackles, etc, equivalent to BB26 to connect with the base brackets.)

Fig. 1-1 Slinging by crane

1-2 Lifting by Forklift

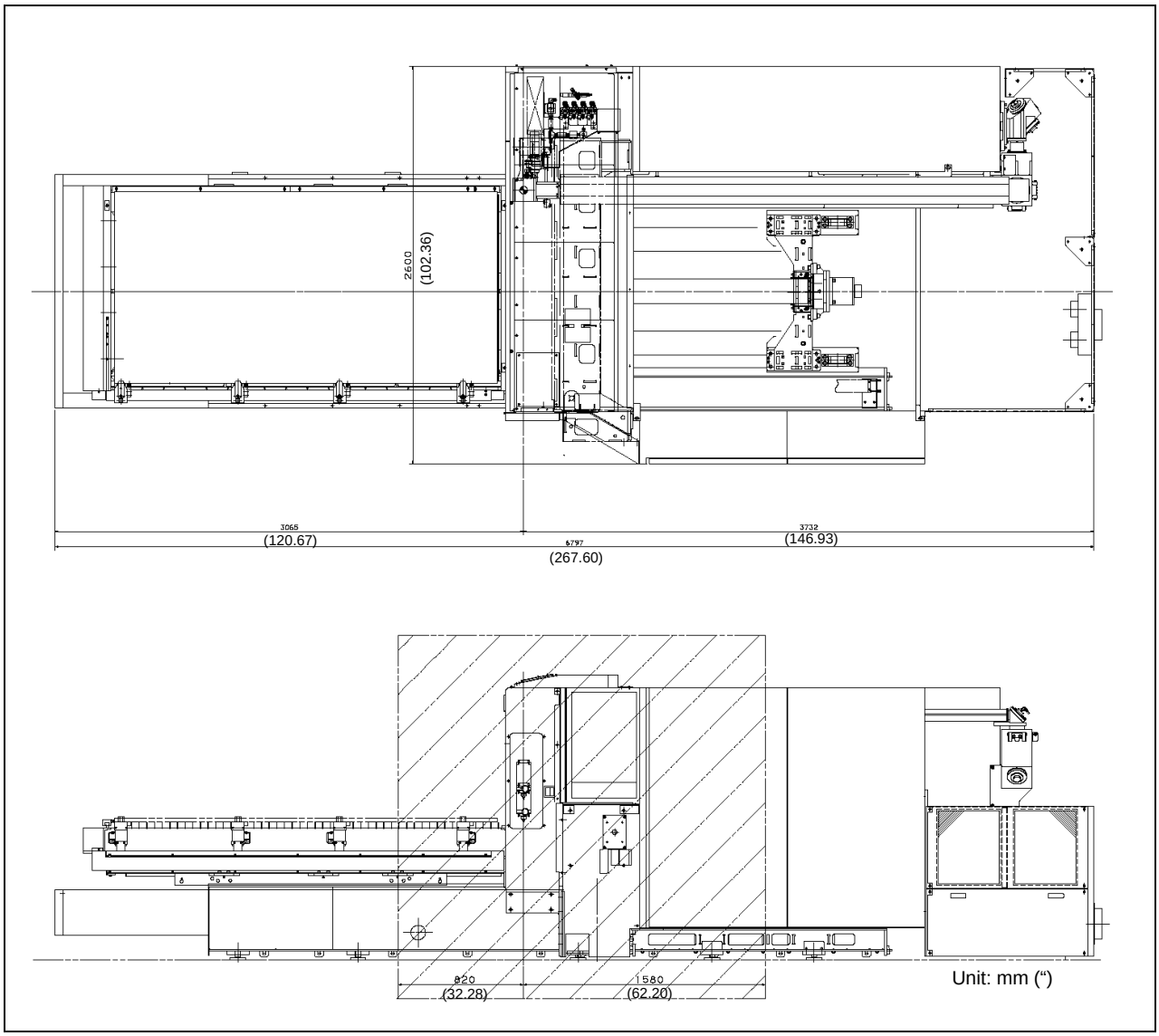


Fig. 1-2 Lifting by forklift

For lifting the machine by a fork lift, balance the machine weight at the center of the column part. Do not lift the machine at a position that is extremely away from the column. (The hatched part is a measure to use.)

In addition, use a fork [2600 mm (102.36”) or longer] that can carry the cover part of the oscillator or eelctric control cabinet base part without fail.

2 TO MOVE THE LASER MACHINE

To mover the laser machine, mount at least 6 roller trucks at the hatched parts ▨ of Fig. 2-1.

Hook a hook at each base jack hole and slinging pipe for moving the machine.

Note : Do not pull the slinging pipe in the axial direction or it will be pulled out.

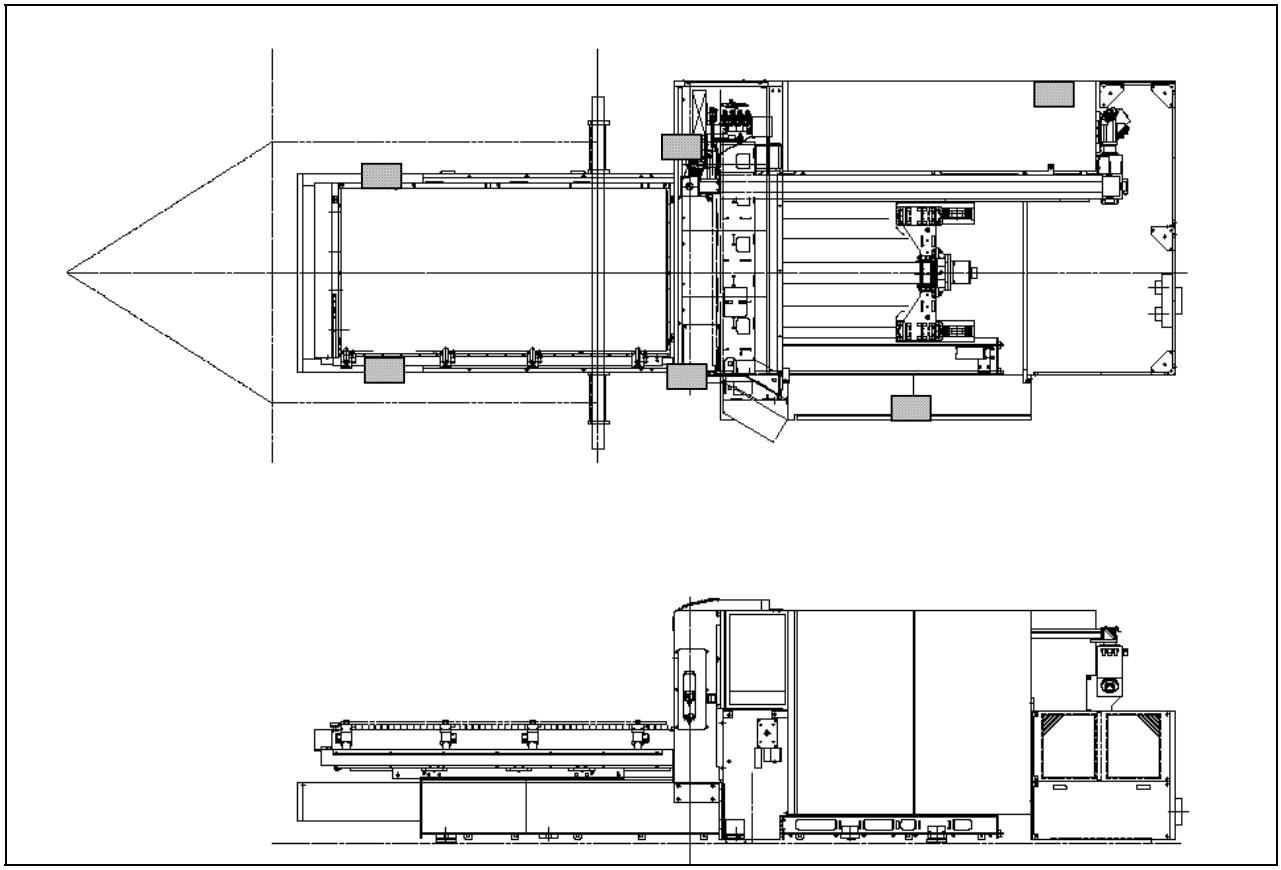


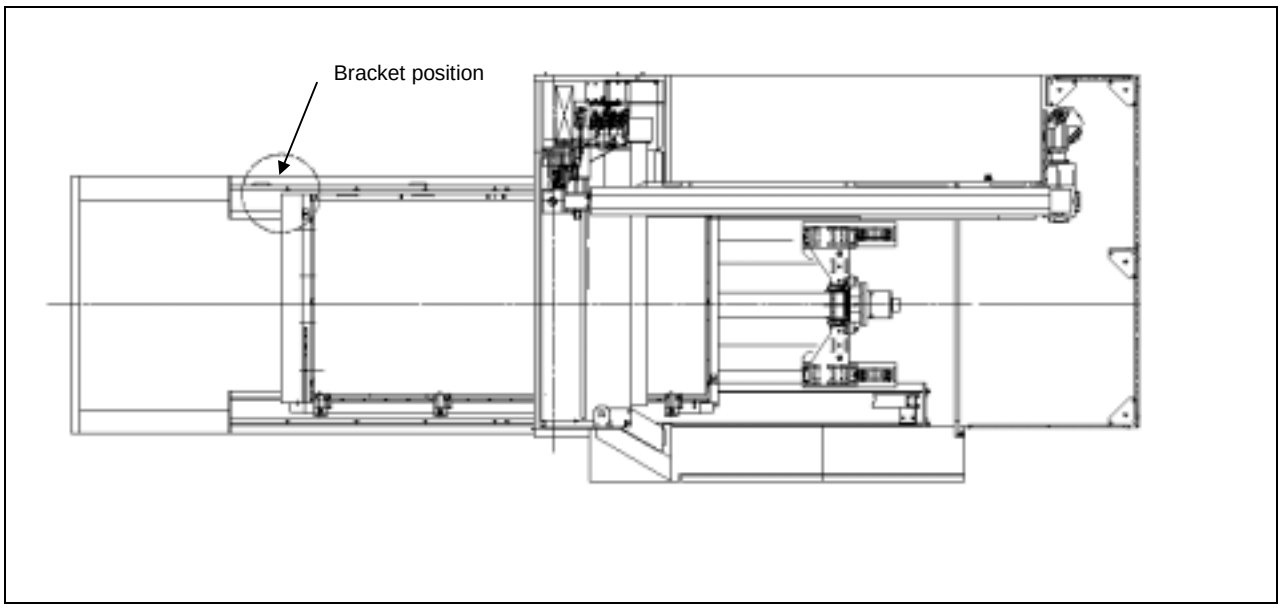
Fig. 2-1

3 REMOVING BRACKETS

3-1 Removing Brackets from Machine Side

Remove all brackets from the axes (X & Y) of the machine.

1. X-axis brackets



2. Y-axis brackets

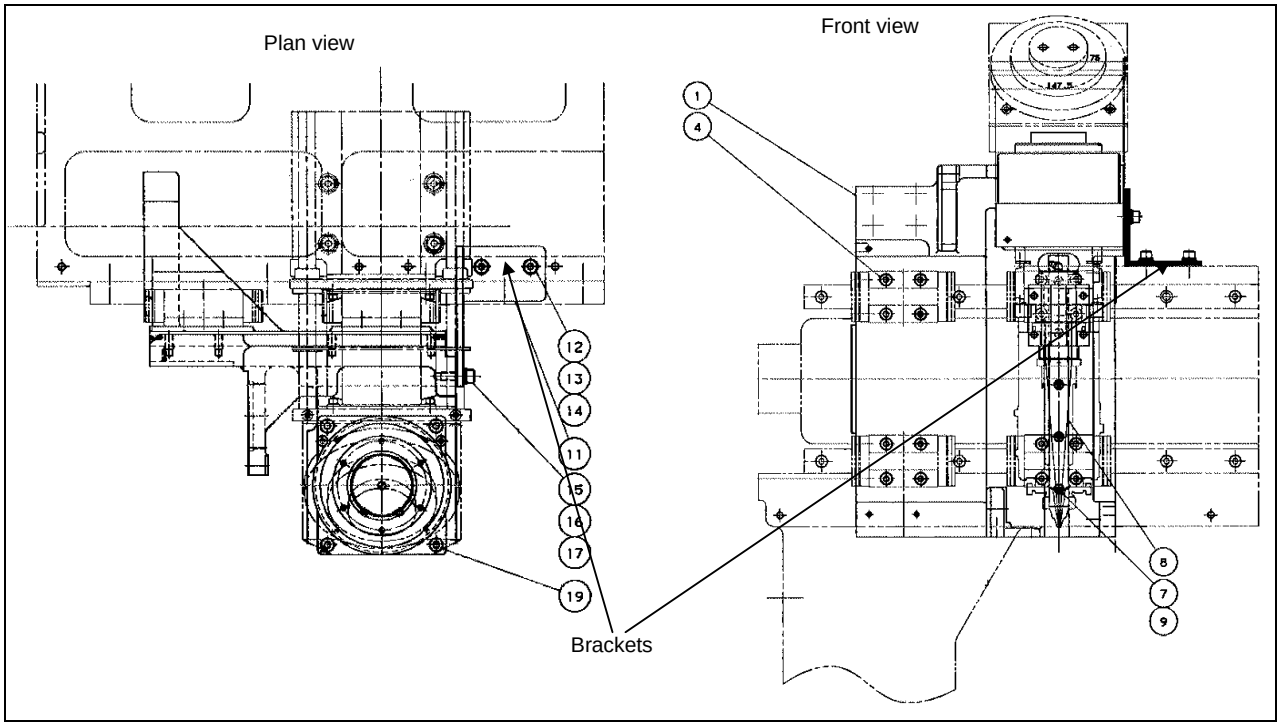


Fig. 3-1

3-2 Removing Brackets from Oscillator

Remove the panel from the center of the oscillator and remove the brackets (only discharge tube bracekts) as instructed below:

(The following is the extrat from the *SERVICE MANUAL for MATSUSHITA'S MOLDE 8*.)

1. Releasing brackets for transportation

Brackets for transportation per machine model are as follows:

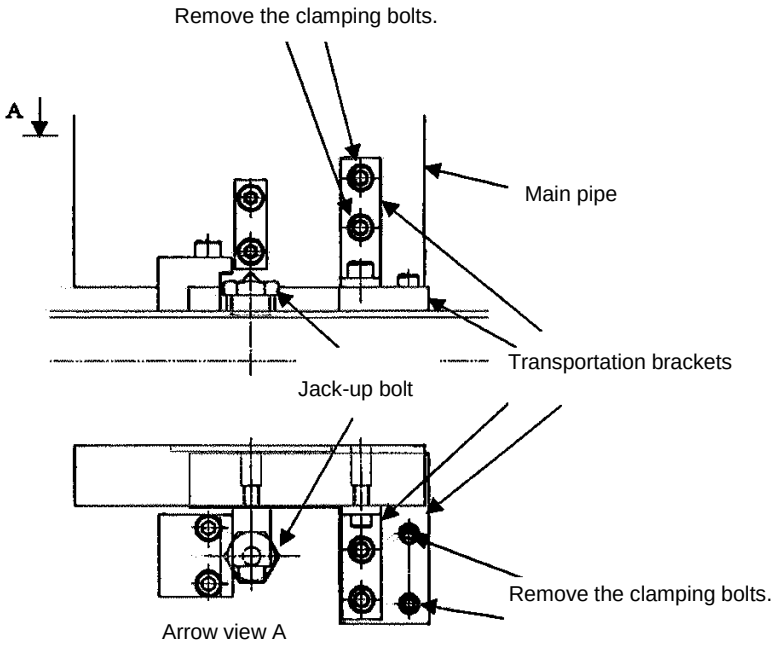
Table 3-1 Brackets for transportation per machine model

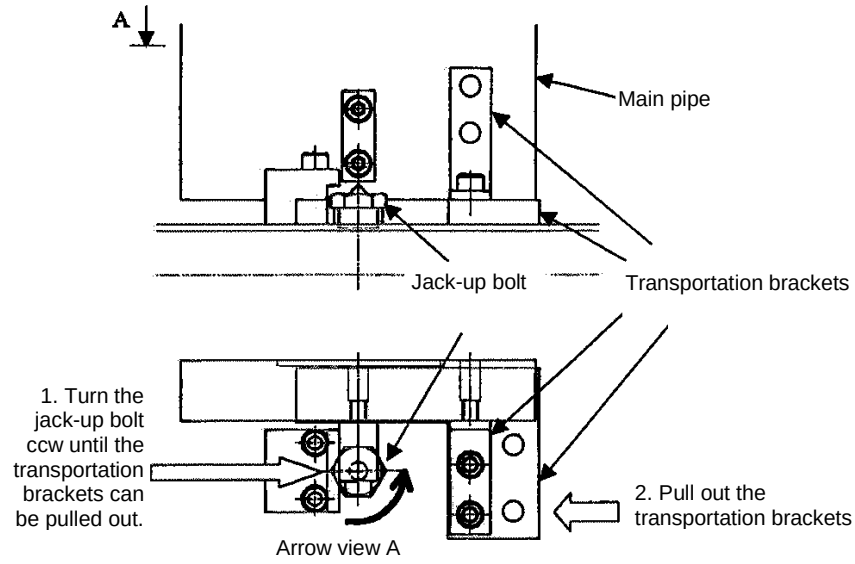
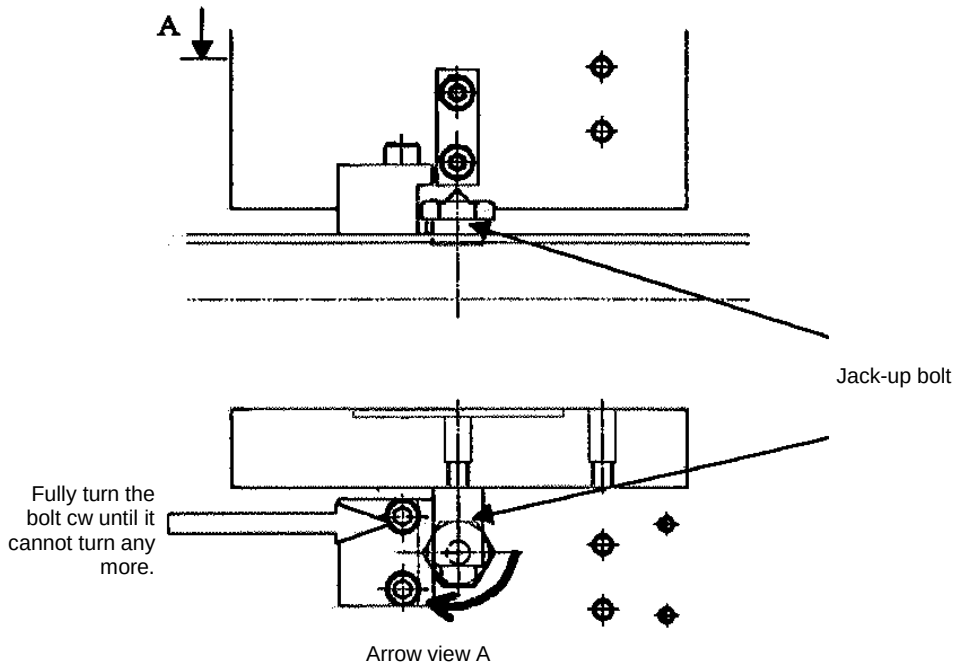
Machine model	YB-L130A8 (8) 1.3 kW
Optical bench transportation bracket	Lower part (1 place) of oscillator main pipe
Blower transportation bracket	None

2. How to release the optical bench transportation brackets

Table 3-2 Procedure

No.	Procedure
1	Pull the clamping bolts (4 places) out of transportation brackets.



No.	Procedure
2	Turn the jack-up bolt counterclockwise to hold up the main pipe. Then you can pull out the transportation brackets. 
3	Next, fully turn the bolt clockwise until it cannot turn any more. 

Note : Keep the removed transportation brackets and bolts stored for the next transportation.

4 MEMO - LEVEL ADJUSTMENT

4-1 Notes before Adjustment

The base center convex status may collapse depending on transportion statuses of the laser machine and level adjustment may become difficult.

To prevent this, after the laser machine is installed, let the base center jacks (2 places) work and leave them as they are for half a day under the condition of the other jacks free.

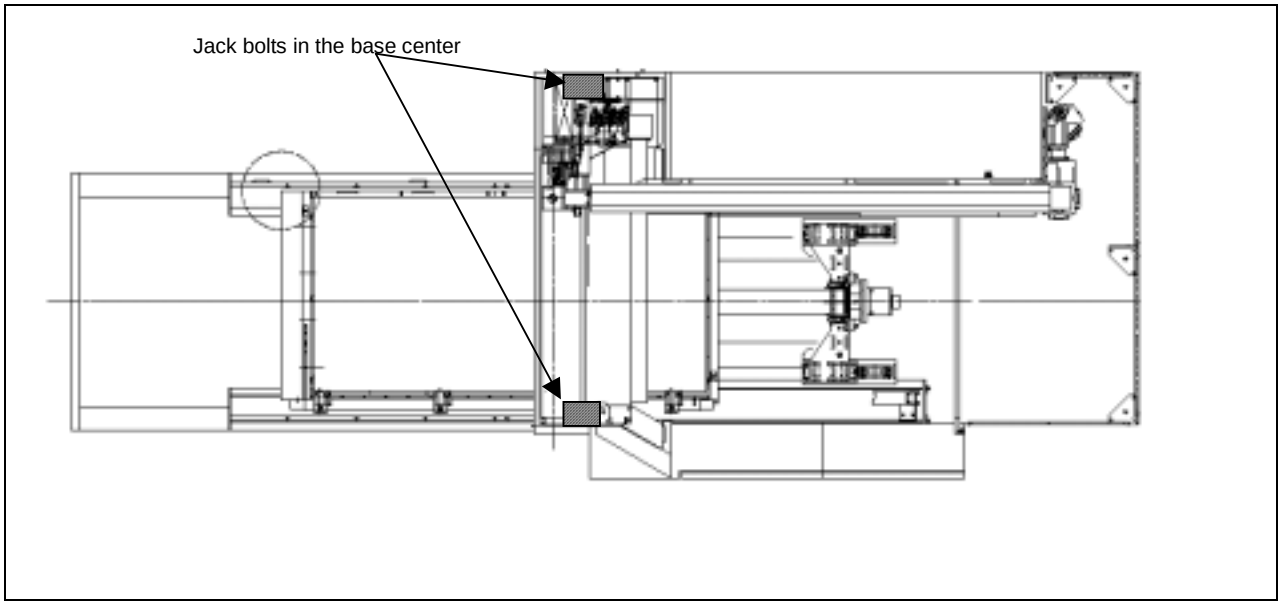


Fig. 4-1

4-2 Level Adjustment

(1) There is a precision level mounting face on the column top. Set precision levels there and adjust the absolute level of the laser machine.

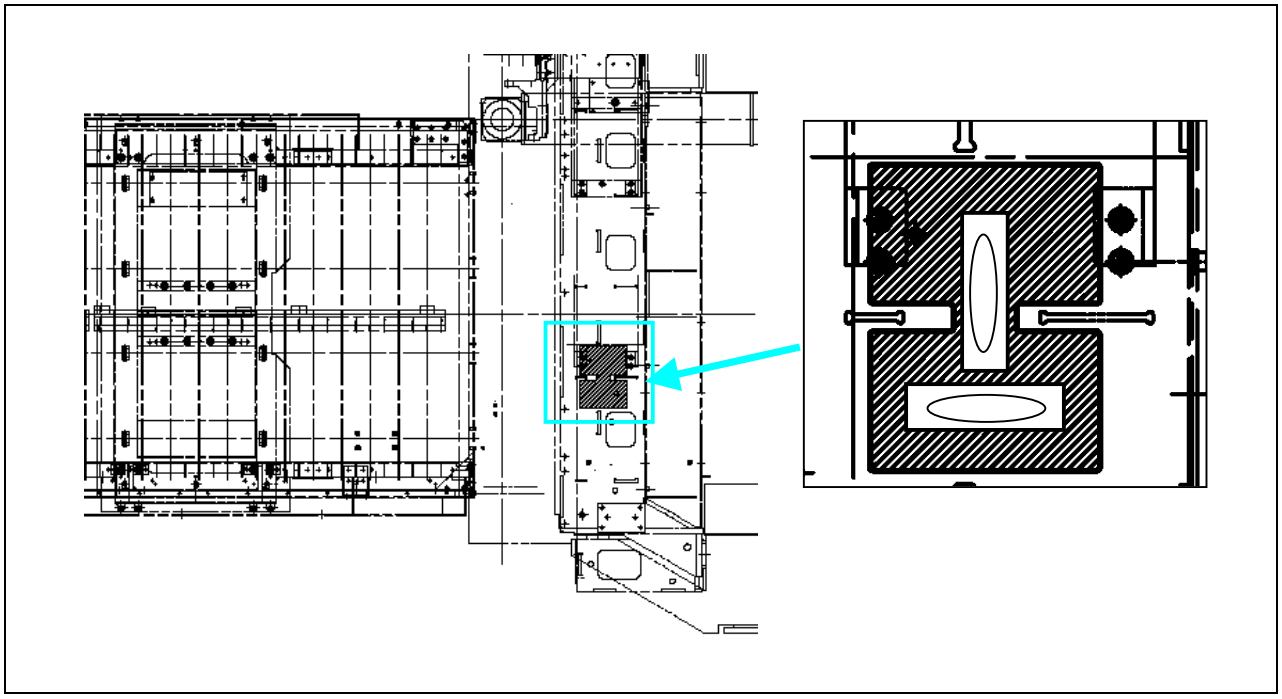


Fig. 4-2

(2) Place a metal plate on the table and set precision levels. Moving the table, adjust the level. At least measure 3 places (center and both ends).

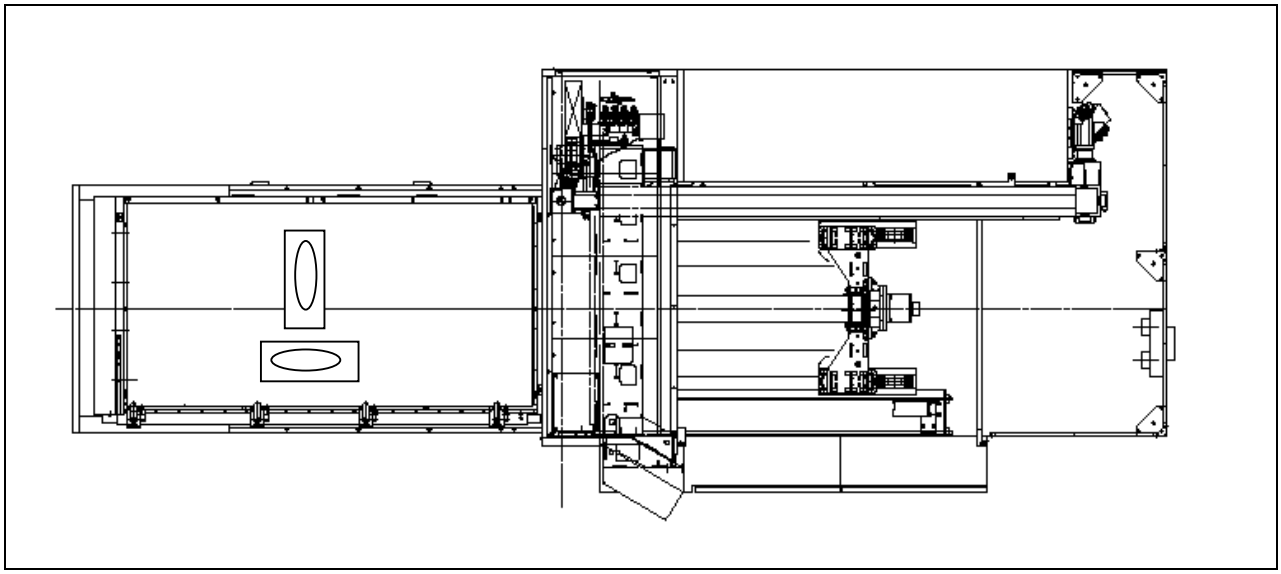


Fig. 4-3

Allowance:

Center convex: 40 μm (0.0016”)

Roll (twist): 40 μm (0.0016”)

5 PIPING & WIRING

Electric wiring and gas piping of ST-X Champion are the same as for ST-X Mk-II series.

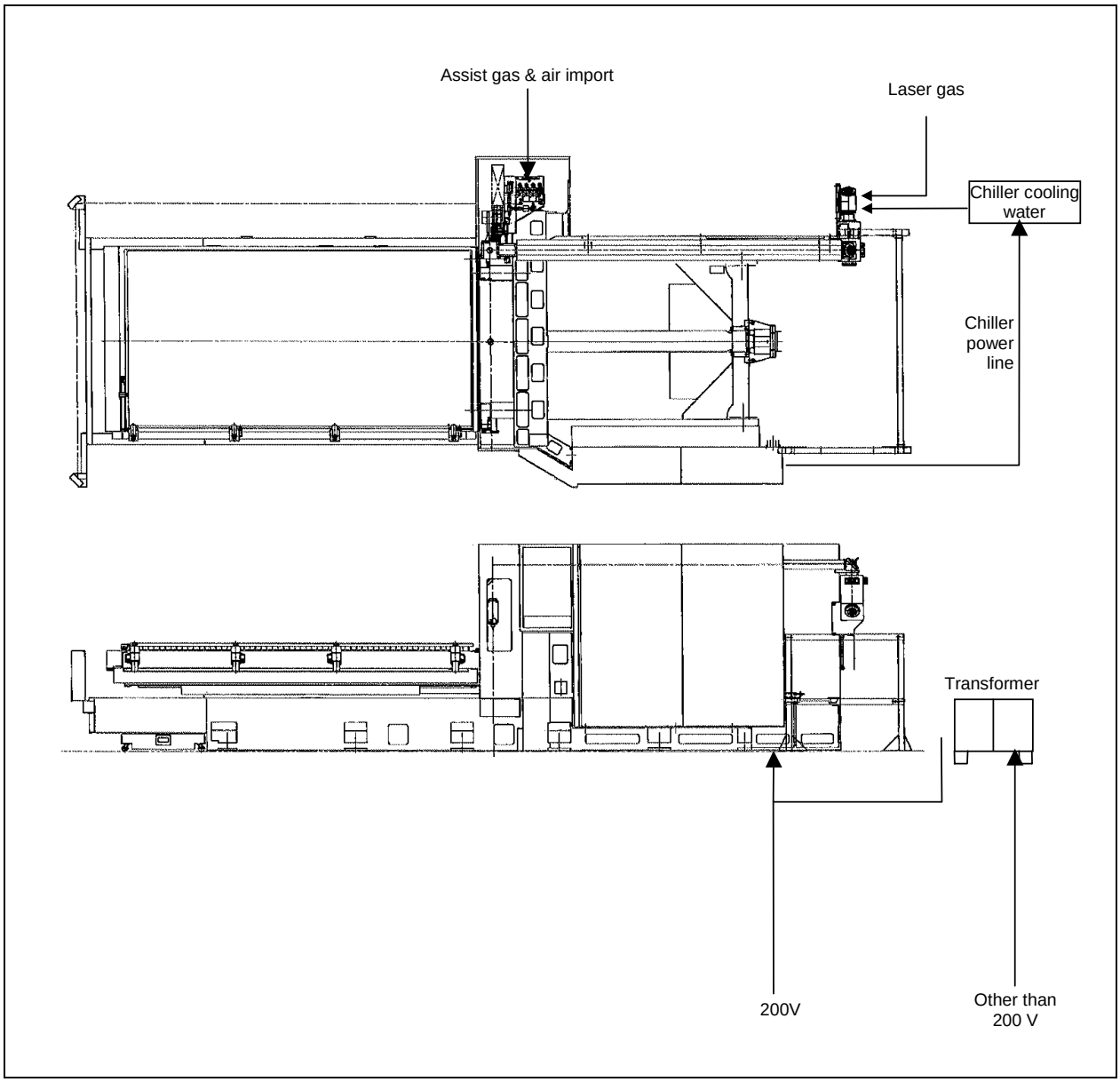


Fig. 5-1

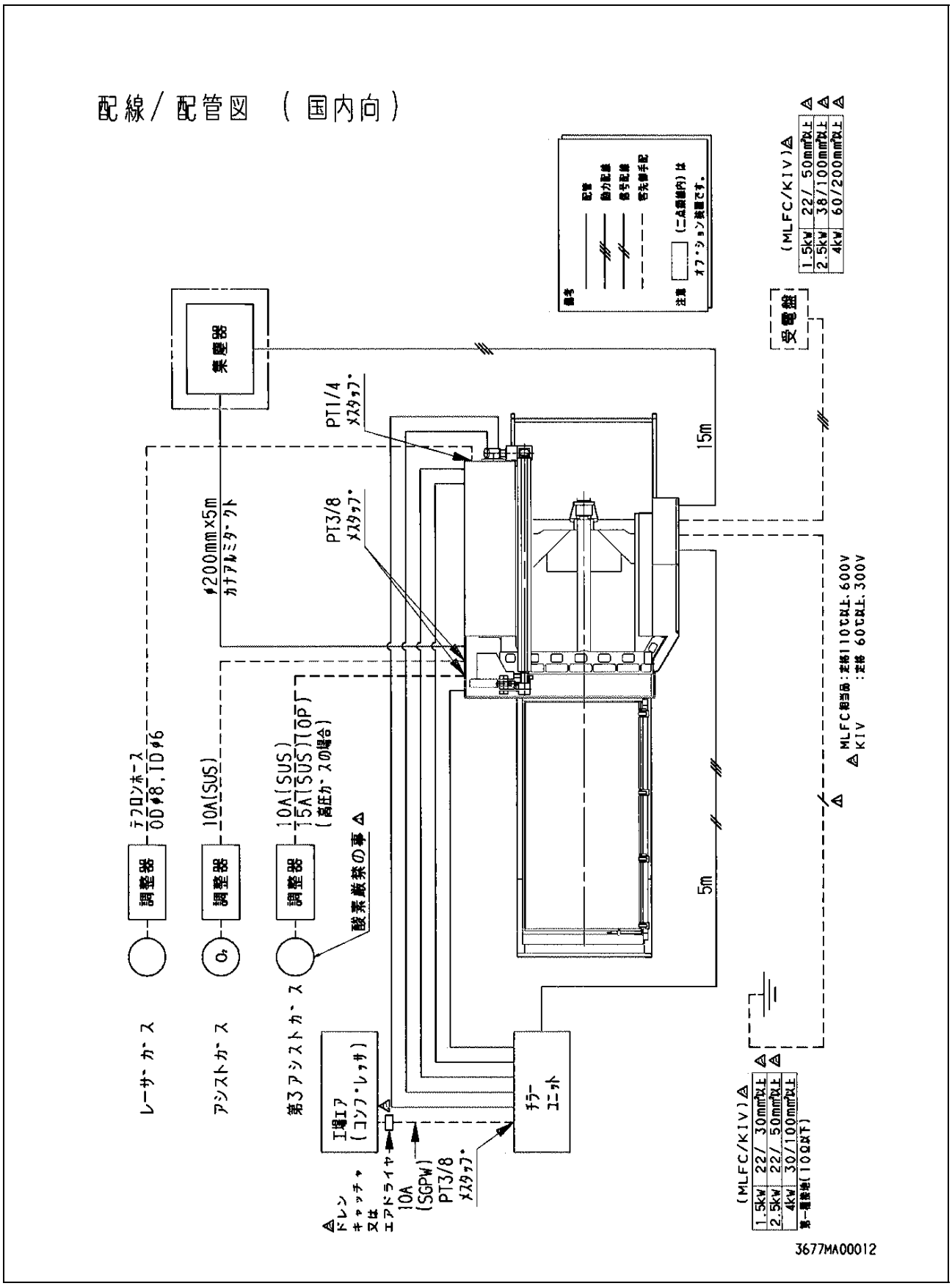


Fig. 5-2 Wiring & piping (Japan)

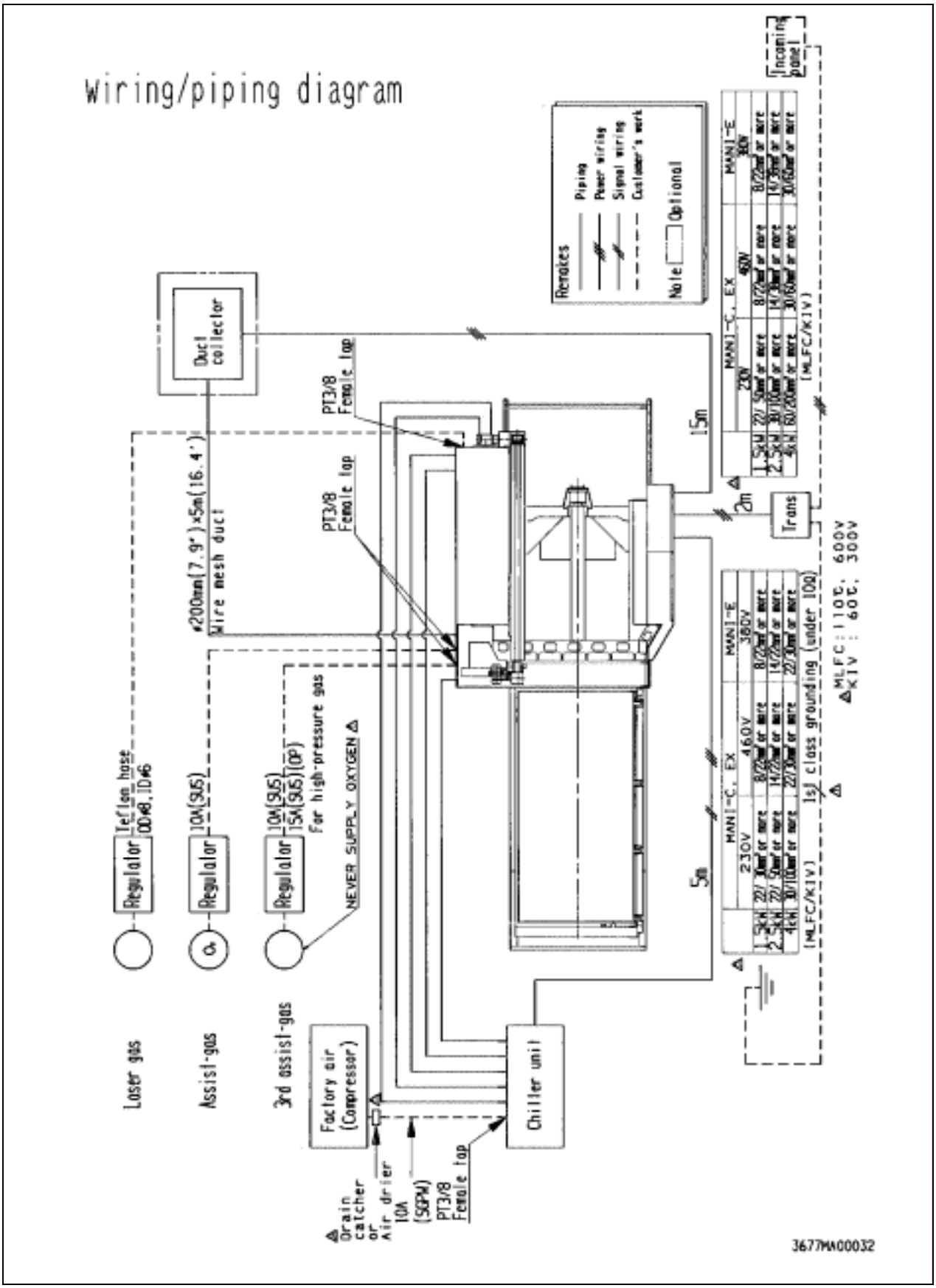


Fig. 5-3 Wiring & piping (Overseas)

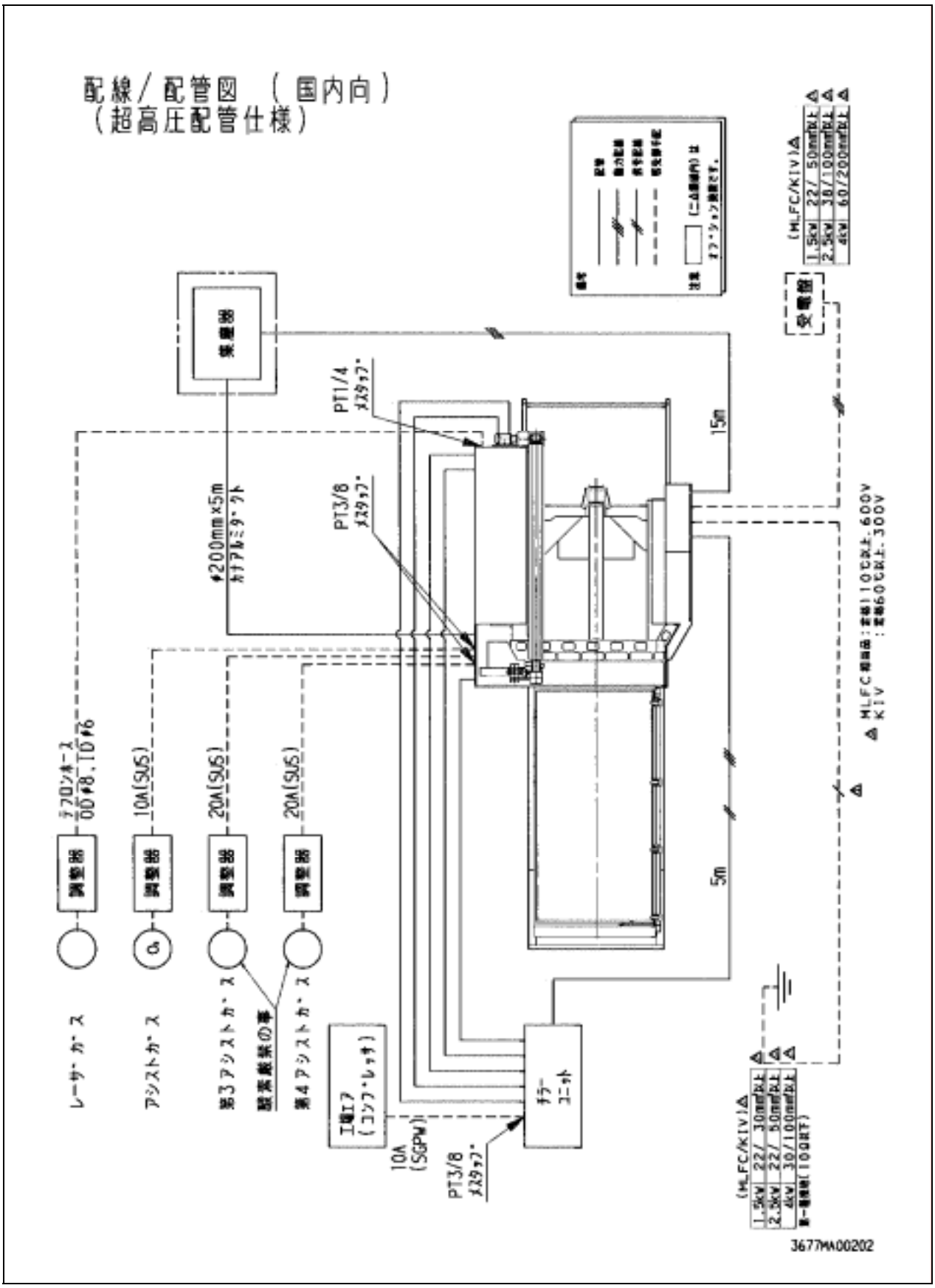


Fig. 5-4 Wiring & super high-pressure piping (Japan)

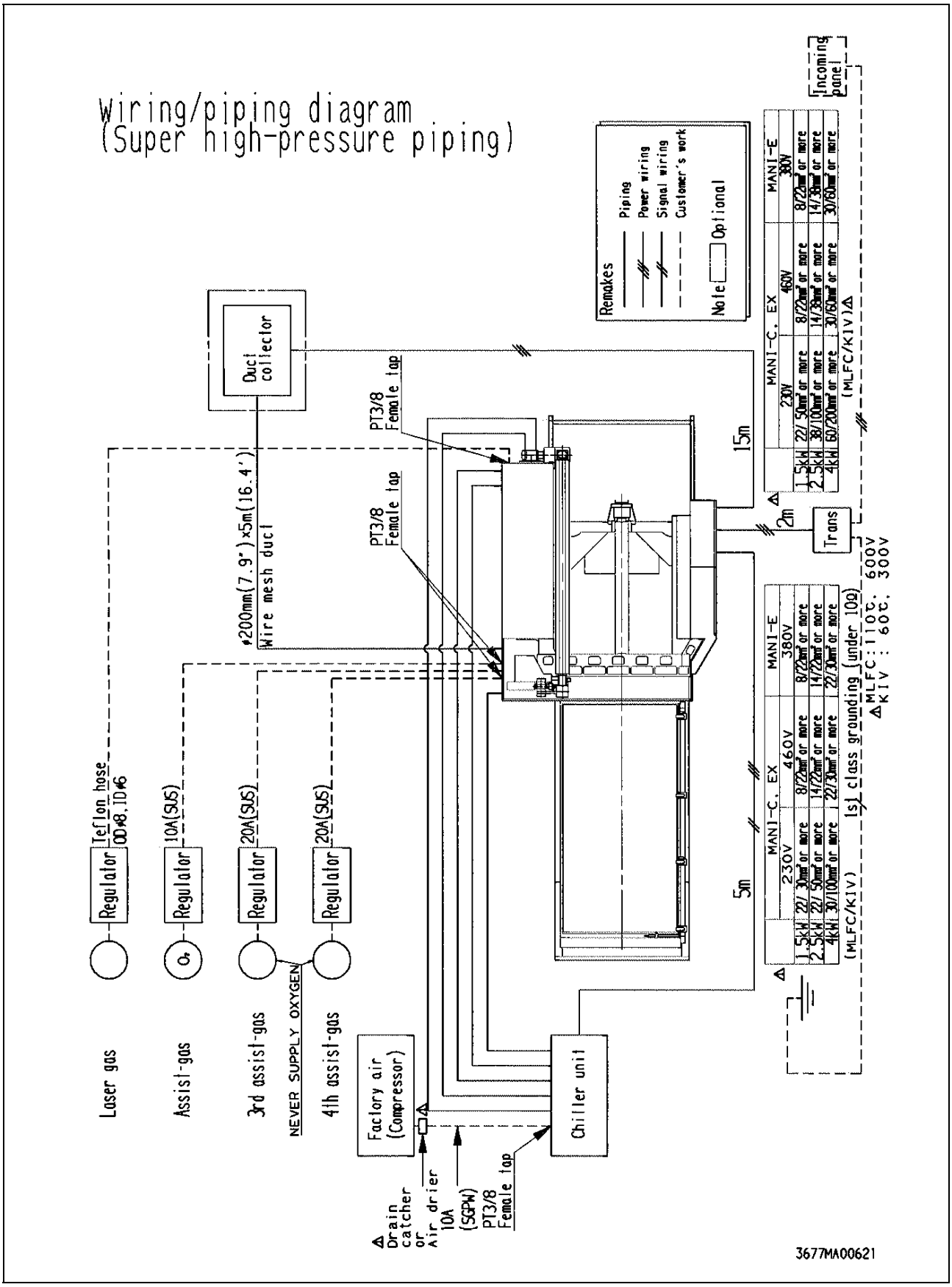


Fig. 5-5 Wiring & super high-pressure piping (Overseas)

5-1 Piping & Wiring of Chiller

The chiller uses the following.

(1)MOC

The chiller made of PARKER

Refer to the corresponding installation procedure.

(2)YMOE

The chiller made of DAIKIN

Refer to the corresponding installation procedure.

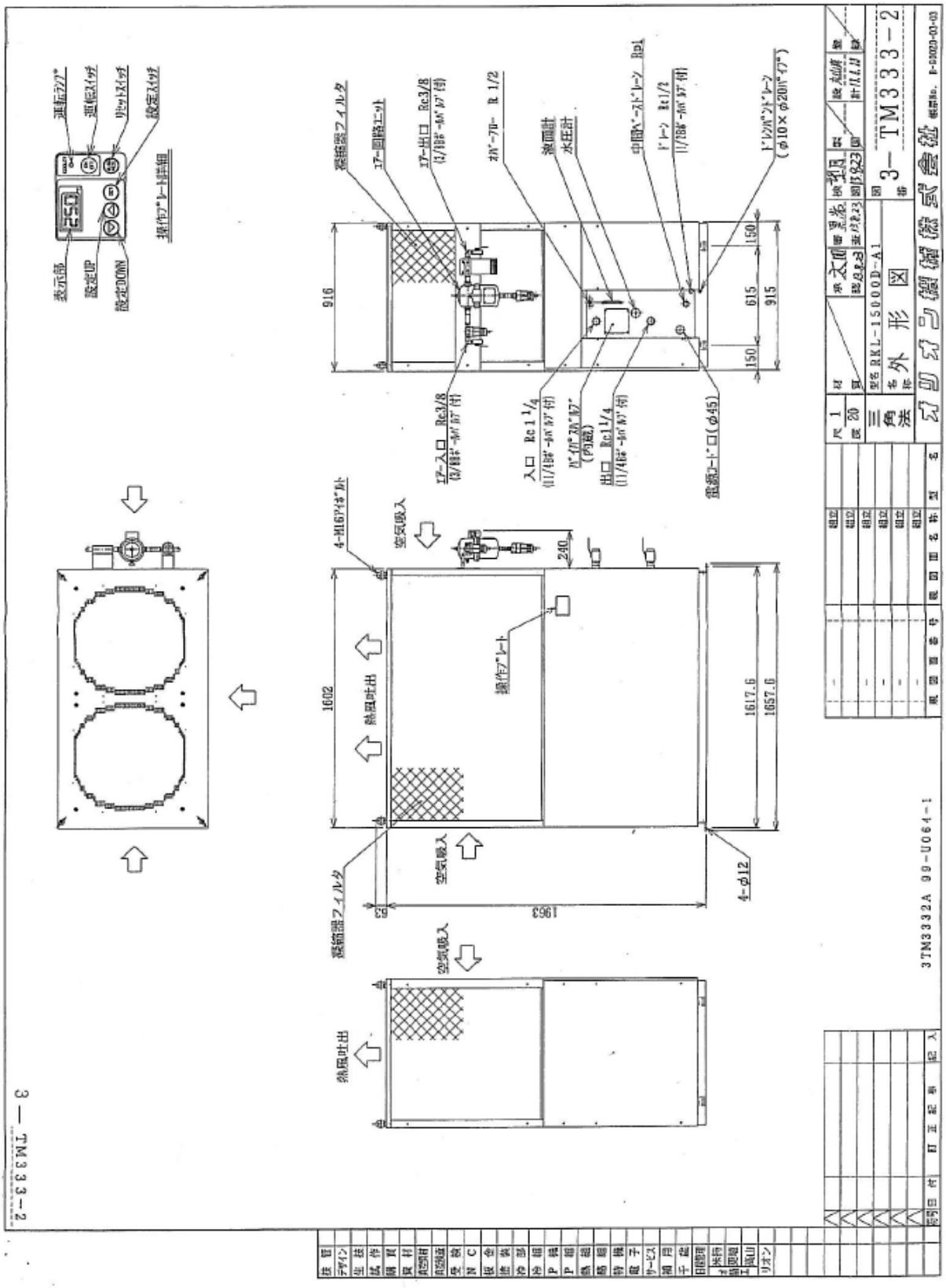
(3)JPN/OHTER COUNTRIES

Orion **RKL-15000D-A2 (4.0kW)**
RKL-9000D-A2 (2.5kW)
RKL-5500D-G2 (1.8kW)

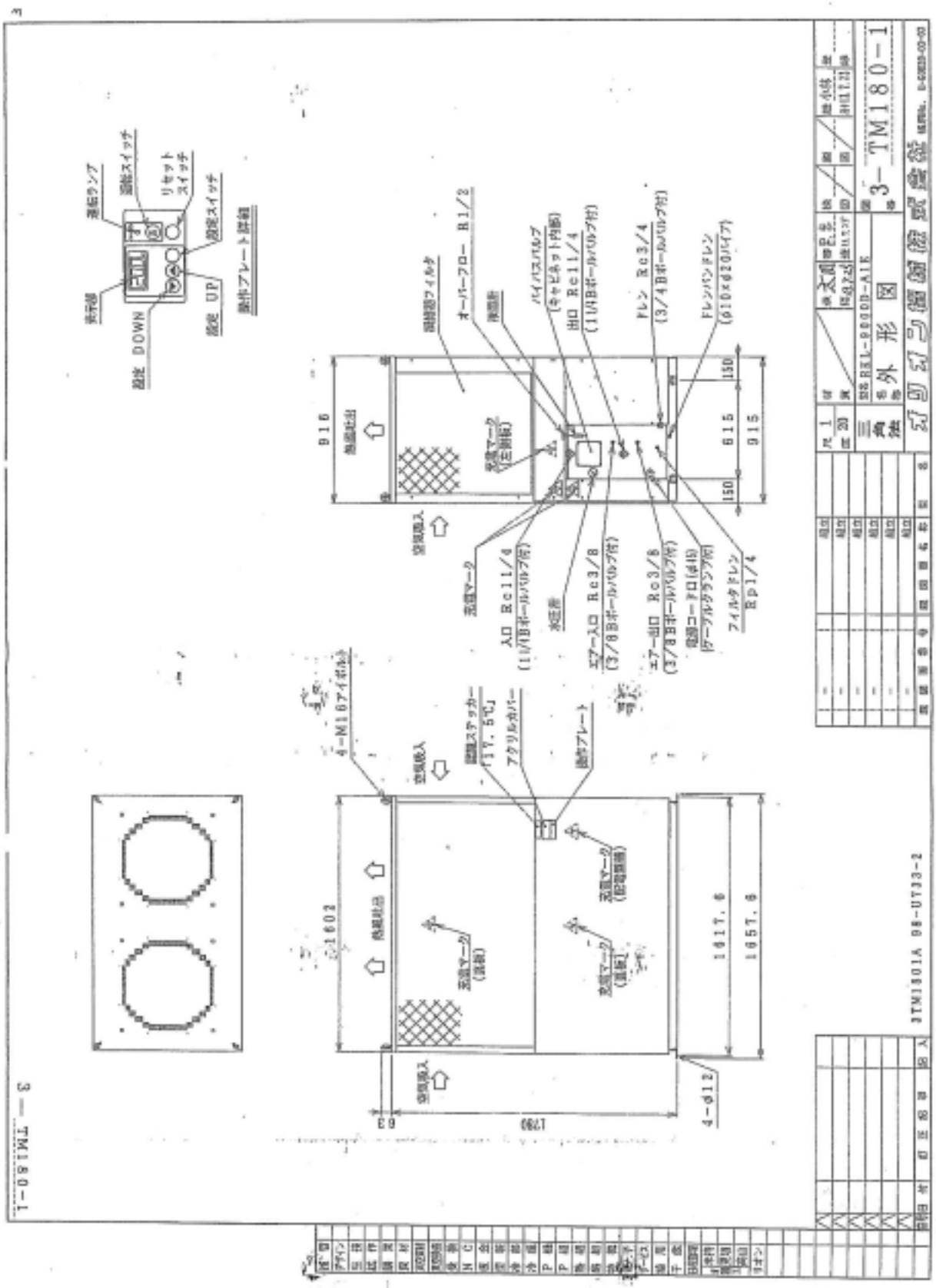
Refer to the full views in the next pages for piping and wiring the chiller.

Set the water temperature at 15-20°C (59-68°F) [standard setting at 17.5°C (63.5°F)].

1. 4.0kW laser machine(JPN/OTHER)



2. 2.5kW laser machine(JPN/OTHER)



3. 1.8kW laser machine(JPN/OTHER)

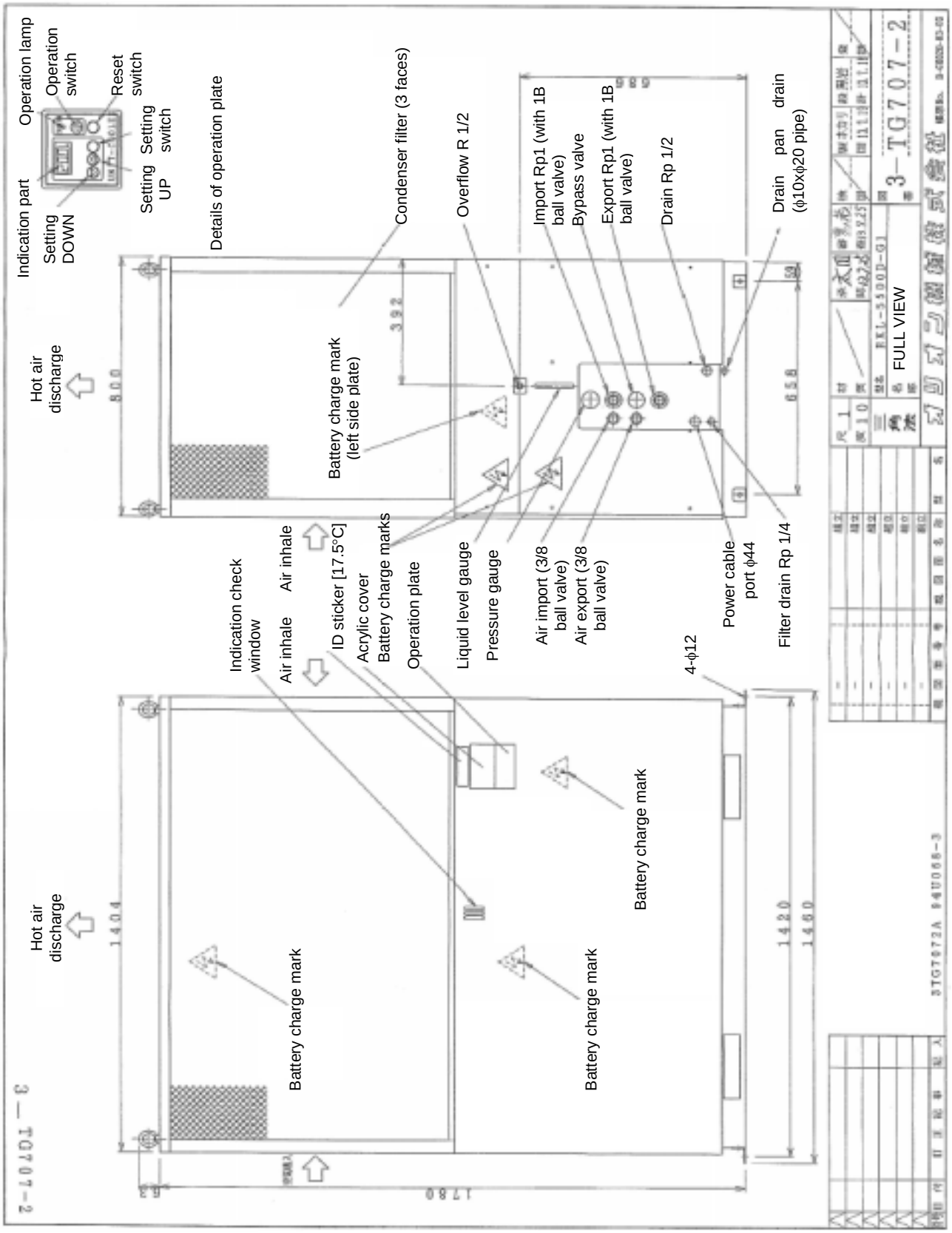


Fig. 5-6

5-2 Checkpoints before Electric Power Work

Important : Before starting electric power work for the laser machine, check the following items:

1. Power cable

Is the power cable between the factory breaker and the laser machine (transformer other than for 200 V) more than the following specifications (wire diameter)?

Table 5-1 Power cable MLFC (110°C or 230°F) / KIV (60°C or 140°F)

	JPN	EX		CE
		230V	460V	
1.8kW laser machine	22/50mm²	22/50mm²	8/22mm²	8/22mm²
2.5kW laser machine	38/100mm²	38/100mm²	14/38mm²	14/38mm²
4.0kW laser machine	60/200mm²	60/200mm²	30/60mm²	30/60mm²

2. Grounding cable

Is the grounding cable as the following specifications (wire diameter)?

Table 5-2 Grounding cable MLFC (110°C or 230°F) / KIV (60°C or 140°F)

	JPN	EX		CE
		230V	460V	
1.8kW laser machine	22/30mm²	22/30mm²	8/22mm²	8/22mm²
2.5kW laser machine	22/50mm²	22/50mm²	14/22mm²	14/22mm²
4.0kW laser machine	30/100mm²	30/100mm²	22/30mm²	22/30mm²

3. Is the grounding resistance 10Ω or under?

4. Grounding work

Check the following points before starting electric work.

(1) Each terminal is connected with an electric cable.

(2) Each laser machine is connected with an electric cable.

(3) Grounding line is connected with a shortest l cable.

A power transformer is needed to to be connected with the machine other than of power voltage 200V (mainly overseas). See 5-4-2.

Here, the transformer must be directly connected with factory power.

(The main breaker is on the transformer side as on the machine tool.)

5-3 Checkpoints When Power Is Supplied

After the work up to Chapter 7, check the following points after power is supplied:

1. Checking power voltage

Is the main breaker (power input terminal of the electric control cabinet with a transformer) of the laser machine 200V ± 10%?

2. Checking phase

Let the chiller work and see if worm air is blowen out of the exhaust (ceiling) of the chiller.

If the chiller is taking air in, the phase is negative. So change 2 phases of the factory breaker or the laser machine breaker and check it again check.

5-4 Wiring Methods

5-4-1 Wiring method for Japan (connection diagrams & electric diagrams)

Wiring method for Japan is as follows. (Connect the factory power cable with the main breaker of the electric control cabinet.)

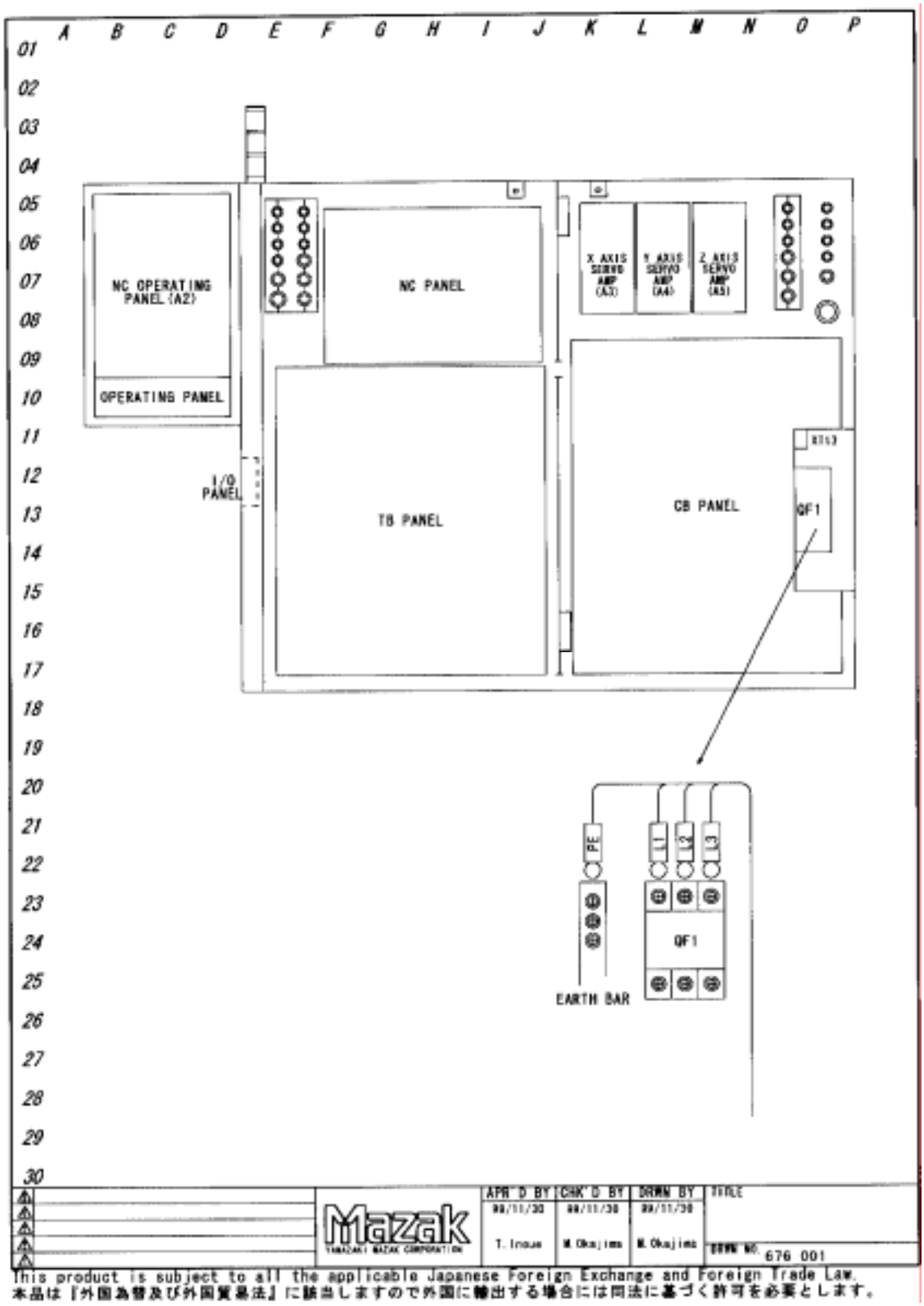


Fig. 5-7 Wiring method for Japan

Wiring to the main breaker is as follows:

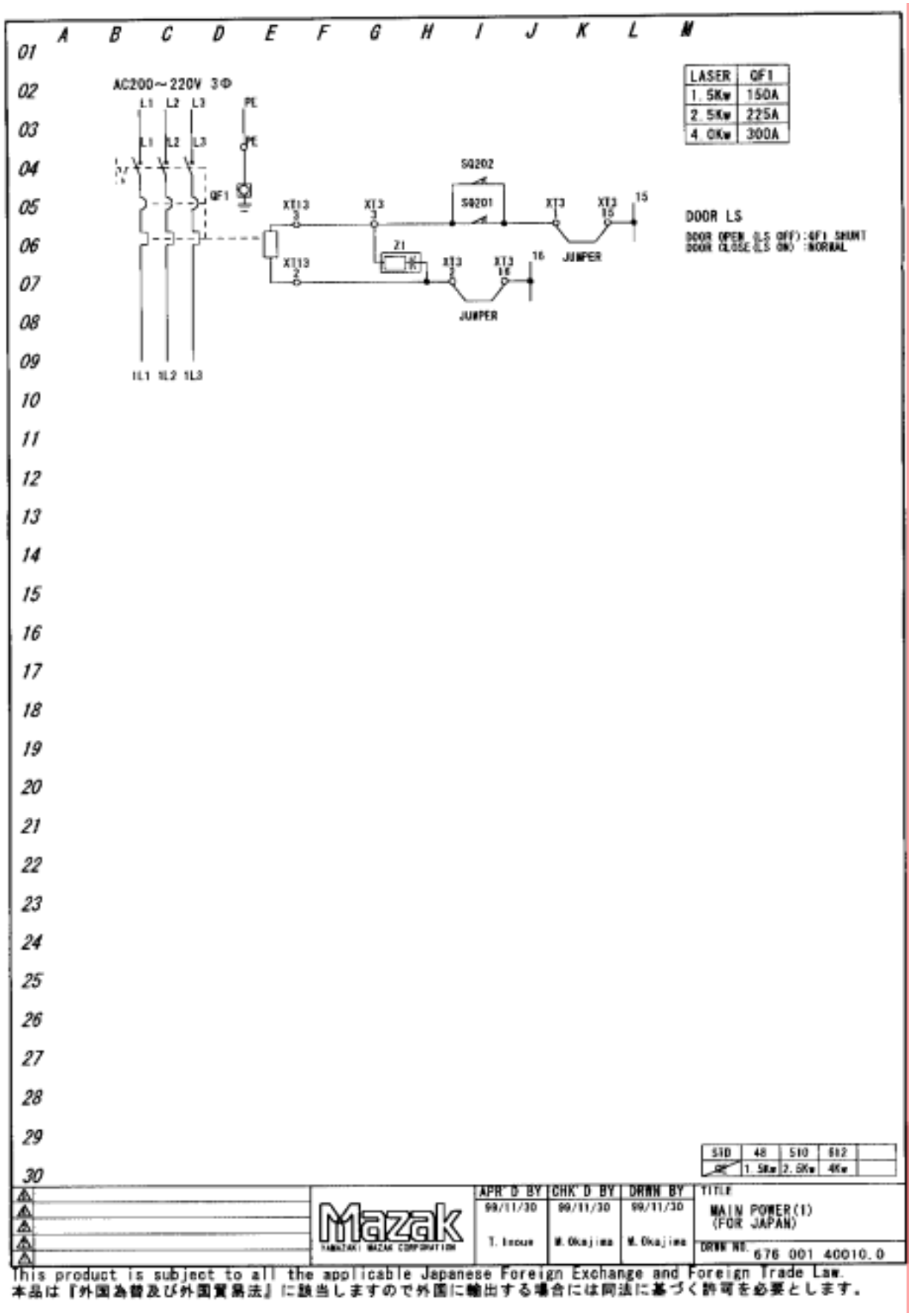


Fig. 5-8 Wiring to the main breaker

5-4-2 Wiring method for overseas & CE (Connection Diagram)

Wiring method for overseas & CE is as follows. (Connect the factory power cable with the transformer.)

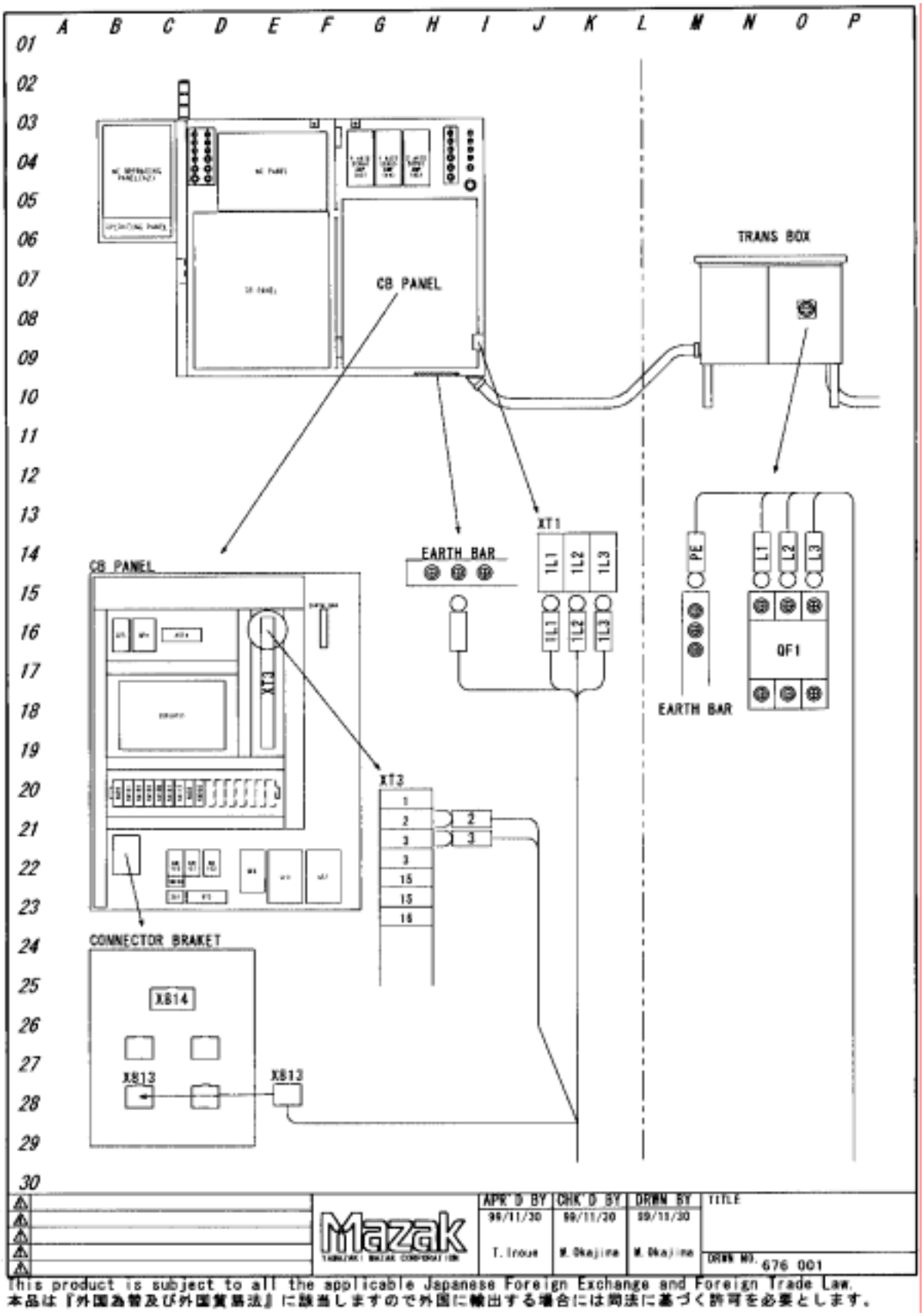


Fig. 5-9 Wiring Methods for Overseas & CE (Connection diagram)

5-4-3 Wiring method for overseas (electric diagram)

Refer to the following electric diagram for wiring:

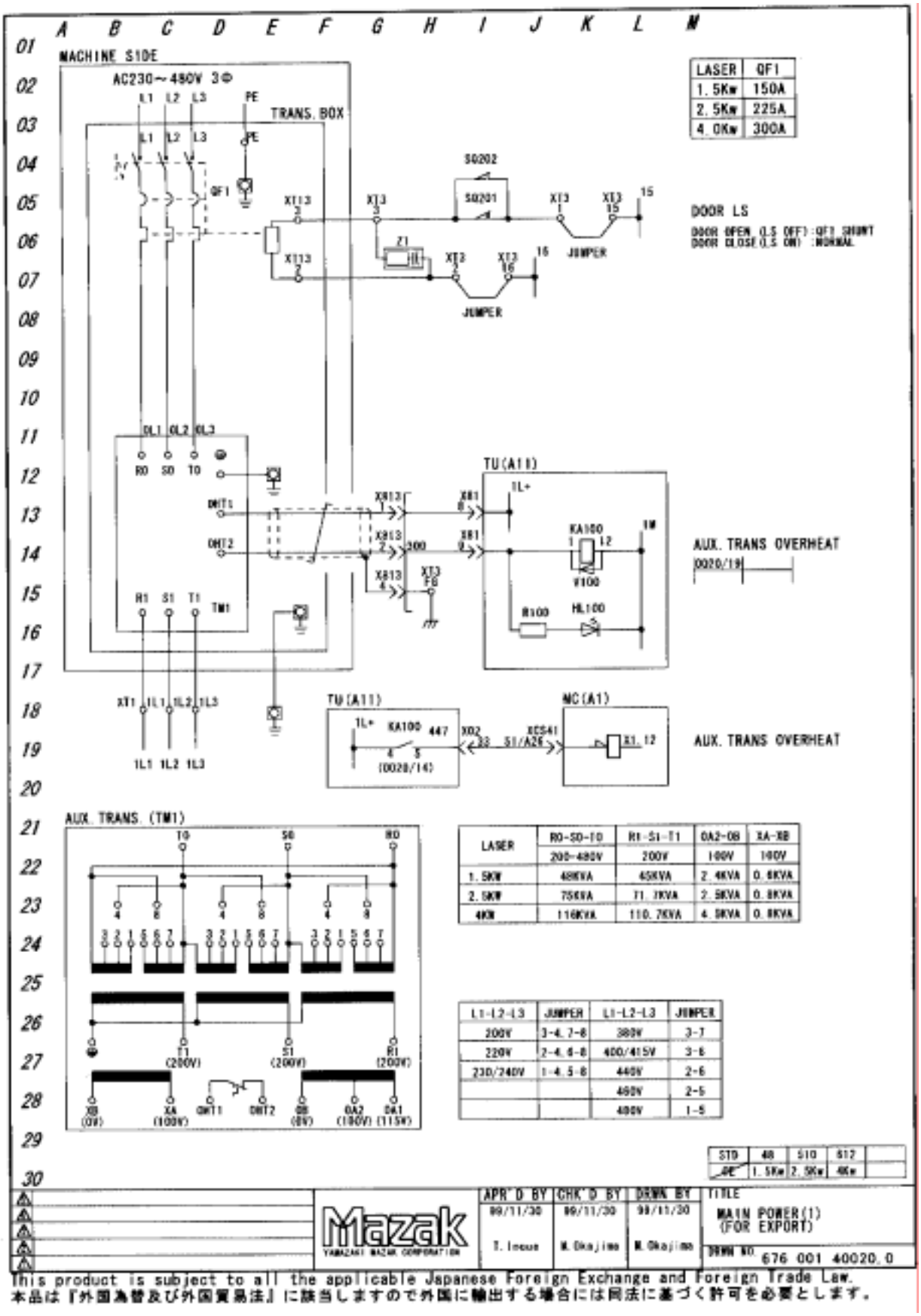


Fig. 5-10 Wiring method for overseas (electric diagram)

5-4-4 Wiring method for CE (electric diagram)

Refer to the following electric diagram for wiring:

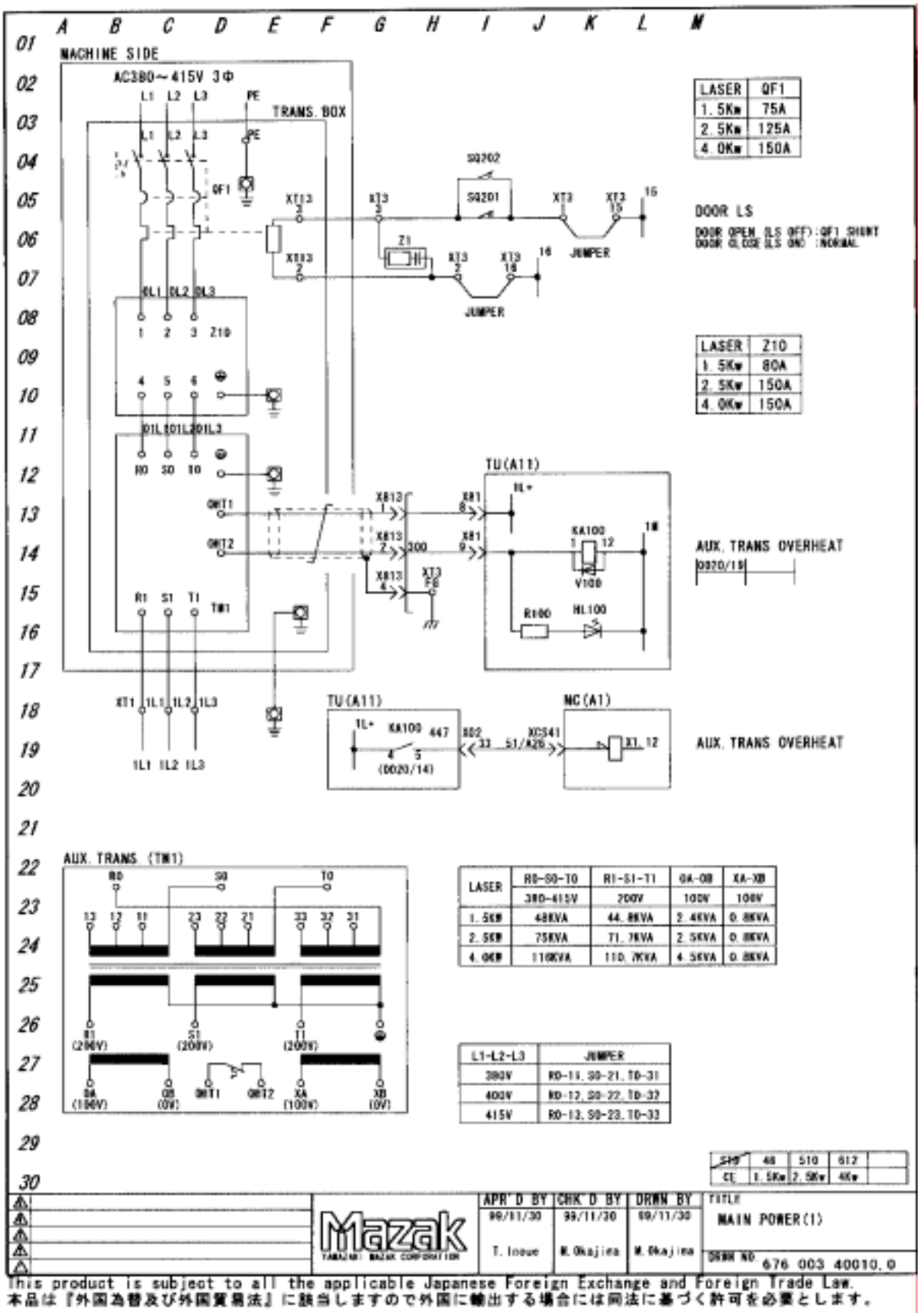


Fig. 5-11 Wiring method for CE (electric diagram)

5-5 Gas Work

Gas piping in machine installation includes out of the following:

(1) Main air
(2) Laser gas
(3) Oxigen gas
(4) Assist gas
(5) High-pressure gas piping } Either one
(6) Super high-pressure gas piping (option) }

Customers are requested to do the construction work between the laser machine [main air (factory air), laser gas, & assist gas] and the gas cylinder.

Check the following items; if you find something wrong with piping or the like, point it out to the customer and ask for improvement.

5-5-1 Main air (factory air)

Confirm that the main air (factory air) is between 0.49 and 0.78 MPa (5 and 8 kg/cm^2 or 71 and114 psi).

Confirm that the supply amount is 300 NL (10.6 ft^3)/min.

5-5-2 Laser gas

1. Laser gas composition

Kind	Mixing ratio	Mixing performance	Purity	Water	Carbon hydride	Others
He	74.9%	Balance	99.995% or more	5 ppm or under	1 ppm or under	No impurity is permitted.
N_2	23.4%	±1%	99.995% or more			
CO_2	1.7%	±0.2%	99.99% or more			

Recommended gas : LASAL P61 (AIR LIQUIDE Japan Ltd.)

2. Regulator setting

Use a regulator of the following specifications and set the supply pressure (secondary side pressure force) at 0.2-0.3 MPa(2.0-3.0 kg/cm^2 or 28-43 psi).

Primary side: 20-24.5 MPa (200-250 kg/cm^2 or 2845-3556 psi)

Secondary side: Maximum 0.5 MPa (5 kg/cm^2 or 71 psi)

3. Laser gas piping

Use O.D. ϕ8 mm (0.31”) x I.D. ϕ6 mm (0.24”) teflon hose.

Recommended hose: Junflon FEP tube (Junkosha Inc.)

After the gas hose is connected, confirm that no gas leaks from the line between the gas cylinder and the laser machine.

(1) Open the gas cylinder valve, read and check the laser gas regulator primary pressure, and close the valve.
(2) Leave it for 30 minutes or more and read the primary pressure.
(3) Confirm that there is no difference between the pressures

of the above (1) and (2).

5-5-3 Oxigen gas

Use a pipe equivalent to 10A SUS.

1. Regulator setting

Set the supply pressure (secondary side pressure force) at 0.78 MPa (8 kg/cm^2 or 114 psi) using a regulator.

Primary side: 24.5 MPa (200-250 kg/cm^2 or 2845-3556 psi)

Secondary side: Maximum 1.5 MPa (15 kg/cm^2 or 213 psi)

5-5-4 3rd assist gas

Important : **Never connect oxigen.**

Use a pipe equivalent to 10A SUS.

1. Regulator setting

Set the supply pressure (secondary side pressure force) at 0.78 MPa (8 kg/cm^2 or 114 psi) using a regulator.

Primary side: 24.5 MPa (200-250 kg/cm^2 or 2845-3556 psi)

Secondary side: Maximum 1.5 MPa (15 kg/cm^2 or 213 psi)

5-5-5 High-pressure gas (option)

Important : **Never connect oxigen.**

Use a pipe equivalent to 15A SUS.

If a high-pressure air supply unit is equipped, refer to the corresponding installation procedure.

5-5-6 Super high-pressure gas (option)

Important : **Never connect oxigen.**

Use a pipe equivalent to 20A SUS.

6 OIL SUPPLY & WATER SUPPLY

After the brackets are removed, supply oil to the oscillator and water to the chiller.

(1) Oil supply to machanical booster

(2) Water supply to chiller

6-1 Oil Supply to Machanical Booster(1.8kW laser machine)

The following is how to supply oil to the machanical boolster (extarcted from the Serviceman Manual 3.6 for Matsushita's Oscillator Model 8).

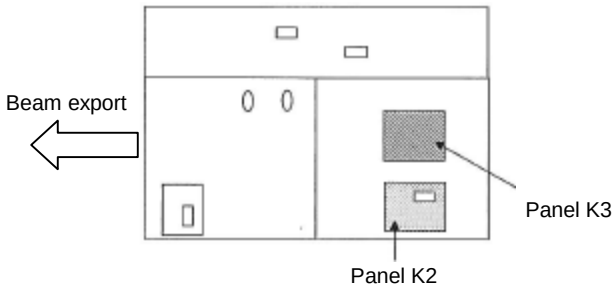
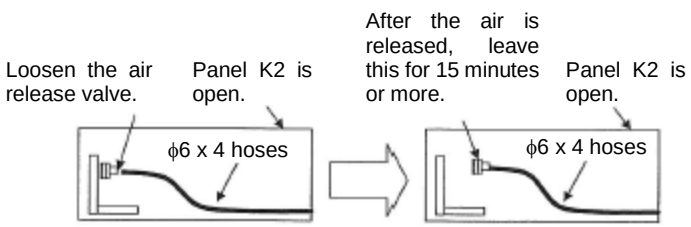
1. Procedure to supply oil to the machanical booster

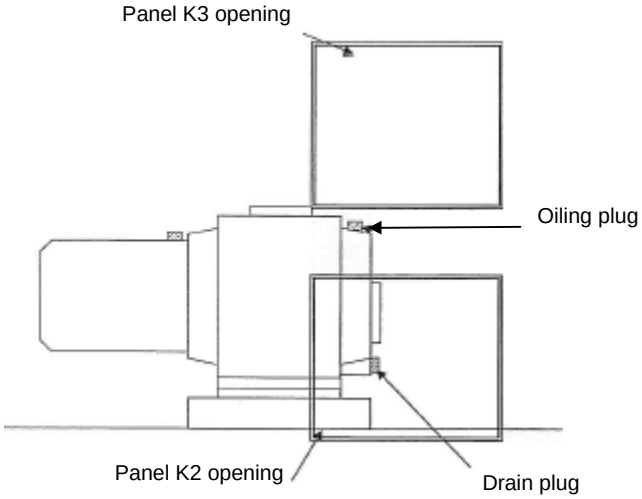
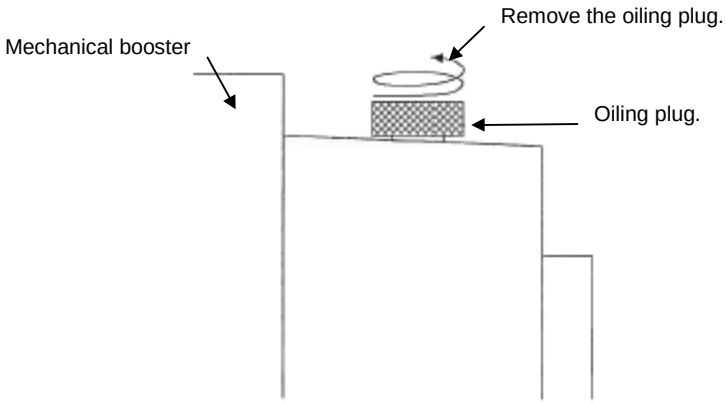
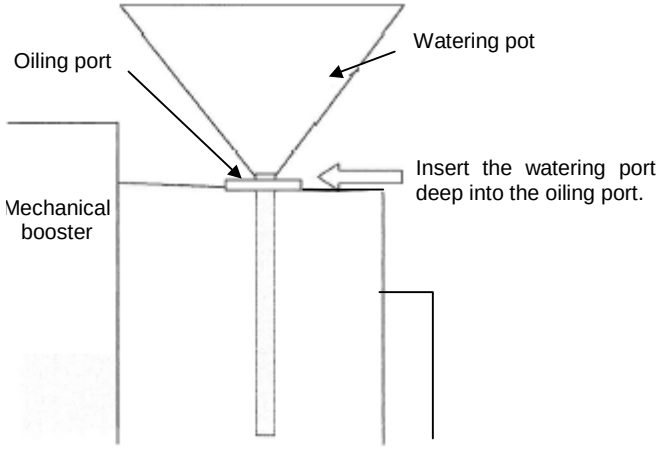
There are 2 types of oiling to the machanical booster (PMB006C).

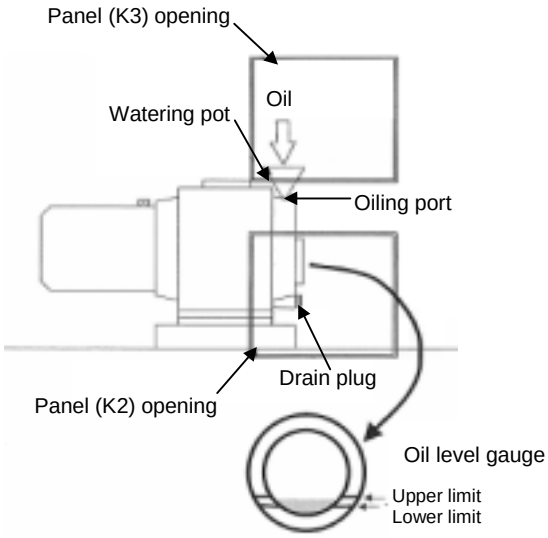
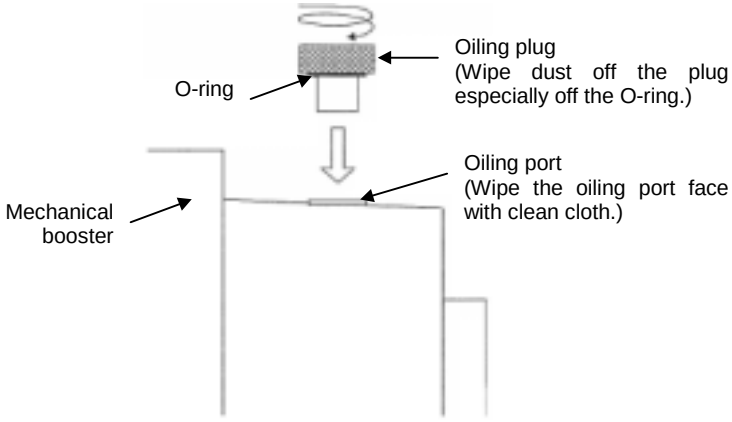
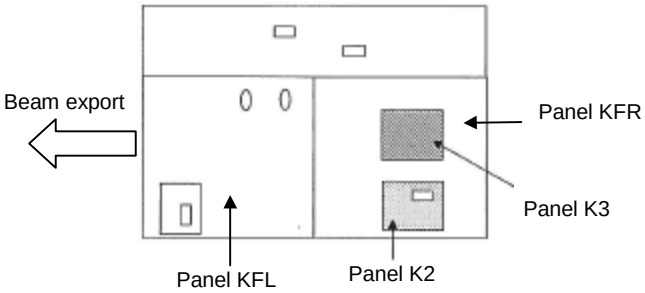
Table 6-1 2 types of oiling

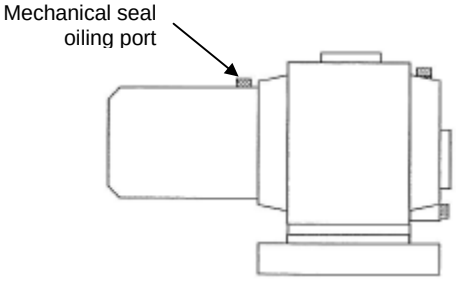
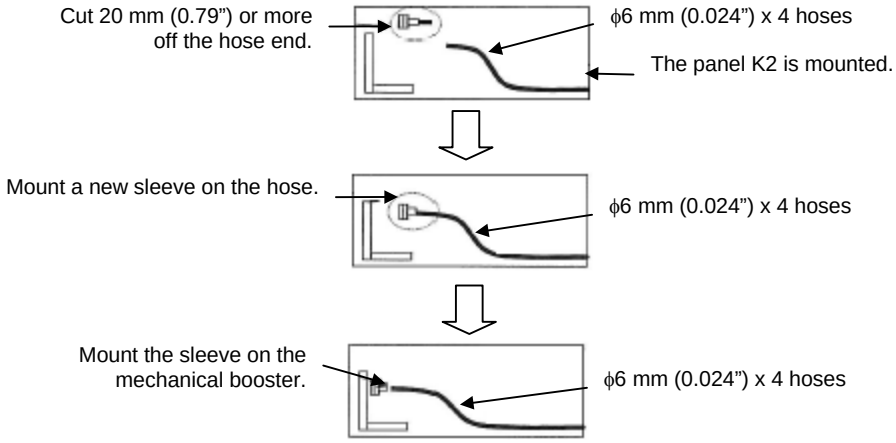
No.	Oiling type	When to oil	Who to supply
1	Oiling to gear	When machine is installed or moved Regular oiling time (2000 hours or 1 year whichever comes earlier)	Customer or trained service engineer
2	Oiling to mechanical seal	Oiling to mechanical seal is not necessary in normal operation of laser machine; however, if a pump stops for more than 3 months or a laser oscillator is moved, be sure to oil to the mechanical seal.	Trained service engineer

Table 6-2

No.	Procedure
1	Stop operation and turn off 200 V and 100 V. When the operation stops, the oscillation interior is very hot; so leave it for more than 30 minutes before starting oiling.
2	Open the panels K2 and K3. 
3	Release air from the panel K2. : **COMPULSORY** Releasing air is to return the "vacuum air system inside a oscillator" under the normal vacuum condition to atmospheric pressure. Failure to this procedure may break the oscillator. Be sure to follow the procedure as instructed here. Loosen and remove the nuts from the air release valves (ϕ6 x 4 hoses) and pull out the valves. Then leave them as they are for 15 minutes or more. 

4	First, let us explain how to supply oil to the gear. Oiling plug is where the panel K3 is opened. 
5	Remove the oiling plug. : **COMPULSORY** Before removing the oiling plug, confirm that 15 or more minutes have passed after air is released. Otherwise, mechanical booster oil may flow into the oscillator vacuum system and break the oscillator. Be sure to follow the procedure as instructed here. 
6	Insert a watering pot into the oiling port. 

7	Supply oil to the area between the upper limit and the lower limit of the mechanical booster via the watering pot. It takes about 1 minute until the supplied oil goes into the mechanical booster interior. The oil level may drop after the oil is supplied to the level line. So check the oil level in 1 minute after oil supply; if the level is lower then the required one, replenish oil till it goes to the required level. 
8	Pull the watering pot out of the oiling port and mount the oiling plug. : **COMPULSORY** If the oscillator without the oiling plug is operated, mechanical booster oil may flow into the oscillator vacuum system and break the oscillator. Be sure to mount the oiling plug. Mount the oiling plug. 
9	That is all about oil supply to the gear. The next is how to supply oil to the mechanical seal. Practice this only in need. It is unnecessary to supply oil to the mechanical seal in normal operation of the machine. However, if the pump stops for more than 3 months or the laser oscillator is moved, supply oil to the mechanical seal without fail. In addition, this must be done only by a trained service engineer. Open the panels KFL and KFR. 

10	Remove the plug from the oiling port to supply oil to the mechanical seal. : **COMPULSORY** Before removing the plug, confirm that more than 15 minutes have passed after air is released. If the oiling block is lidded before air is completely released, the mechanical booster oil may flow into the oscillator system and break the oscillator. Be sure to follow the procedure as instructed here.  Supply 20 mL of oil from the mechanical seal oiling port using the nozzle bottle (20 mL/0.005 gal in full) provided. After oil is supplied, mount the plug on the oiling port without fail. That is all for oiling the mechanical seal.
11	Return the air release plug to the original place. Then, cut 20 mm (0.79”) or more off the hose end and mount a new sleeve on the hose. Mount the sleeve on the mechanical booster in the opposite direction of demounting. 
12	Return the removed panel to the original place.

6-2 Oil supply of the Turbo Blower (2.5/4.0 kW laser machine)

6-2-1 Checking the quality and quantity of oil (every day)

During machine shutdown, check the oil level gauge to make sure that the oil level is between the upper and lower limits. If the oil level is below the danger level, immediately replenish oil to avoid the occurrence of trouble with the turbo blower.

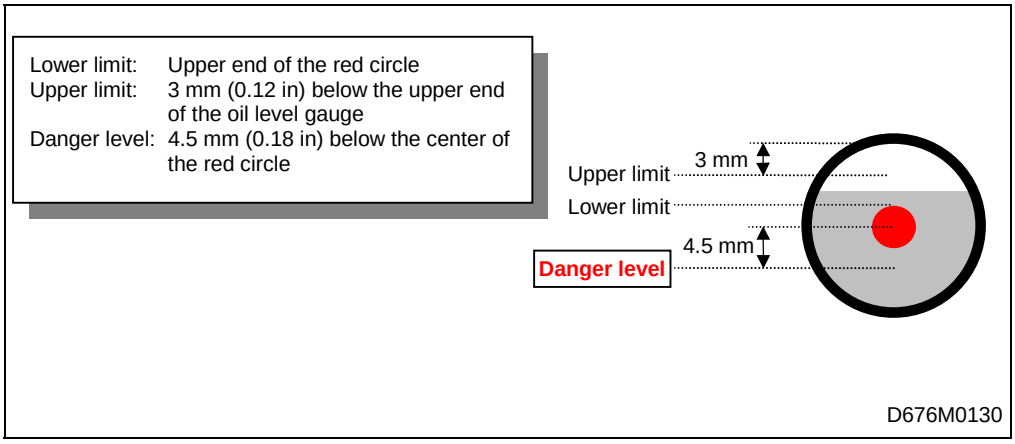

Lower limit: Upper end of the red circle
Upper limit: 3 mm (0.12 in) below the upper end of the oil level gauge
Danger level: 4.5 mm (0.18 in) below the center of the red circle
Upper limit
Lower limit
3 mm
4.5 mm
Danger level
D676M0130

Fig.6-1 Oil level gauge of the turbo blower

Check the oil level gauge positions referring to Fig.6-2

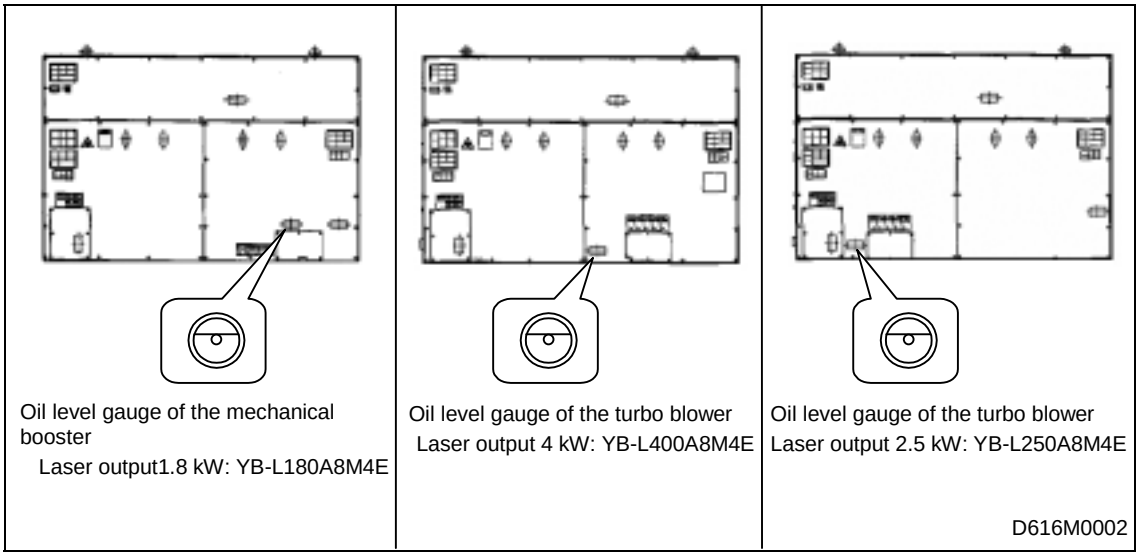

Oil level gauge of the mechanical booster
Laser output1.8 kW: YB-L180A8M4E
Oil level gauge of the turbo blower
Laser output 4 kW: YB-L400A8M4E
Oil level gauge of the turbo blower
Laser output 2.5 kW: YB-L250A8M4E
D616M0002

Fig.6-2 Checking the quantity of oil

6-2-2 Procedure for lubricating the turbo blower (2.5/4.0 kW)

The oscillator is provided with maintenance covers (panel K2 and K3), as shown in Fig. below. Removing these covers allows you to perform lubrication of the oscillator.

WARNING

- Do not remove the maintenance cover for any purposes other than maintenance.
- Before removing the maintenance cover, always set the main power breaker to OFF and lock it.
- Never turn on the main power before attaching the maintenance covers. Failure to observe this could cause you to have a serious accident.

1. Requirements

- Hexagon key for 5 mm across flats
- Oil funnel (Accessory)
- Sleeve 6 mm in diameter (1 piece, accessory)
- Oil
  4 kW (Model: YB-L400A8M4E): 0.8 L, or 0.028 ft^3, of Aeroshell Turbine 560
  2.5 kW(Model: YB-L250A8M4E): 0.68 L, or 0.024 ft^3, of Aeroshell Turbine 560
- Wrench for 12 mm across flats
- Waste cloth
- Cutting knife

A. Lubrication procedure

(1) Switch off the laser operation.

(2) Set the main power breaker to OFF.

(3) Allow a cooling time of at least 30 minutes before proceeding with the lubrication.

(4) Open the panel (K2 or K3) (**Note**).

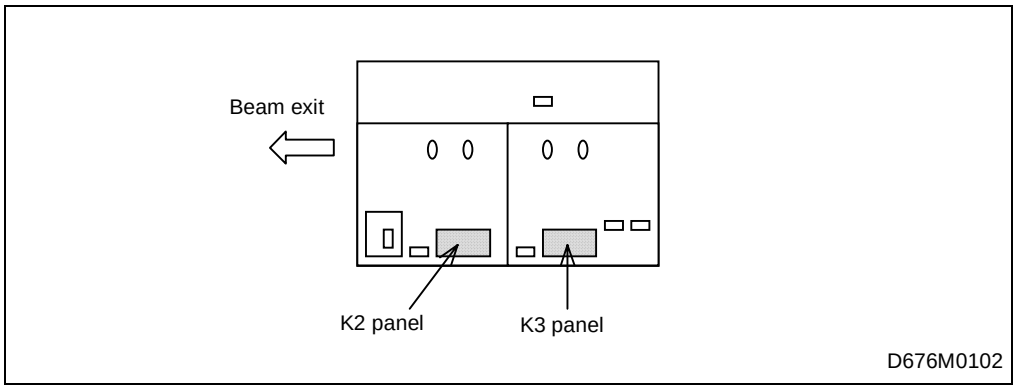


Fig.6-3

The panel type differs according to the oscillator.

Oscillator	Panel
2.5 kW (Type: YB-L250A8M4E)	K2
4 kW (Type: YB-L400A8M4E)	K3

(5) Release the vacuum pressure through the open/close hole of the panel.

CAUTION

- Releasing the vacuum pressure refers to returning the internal vacuum system of the oscillator from its normal vacuum status to an atmospheric pressure. Oscillator damage may result if this operation is not performed as directed below. Proceed in strict accordance with the directions.

First, loosen the cap nut on the vacuum release section (having a connected hose 6 mm or 0.24 in in diameter and 4 m or 13 ft long) using a wrench, and remove the hose. Next after removing the hose, leave the vacuum system intact for at least about 15 minutes.

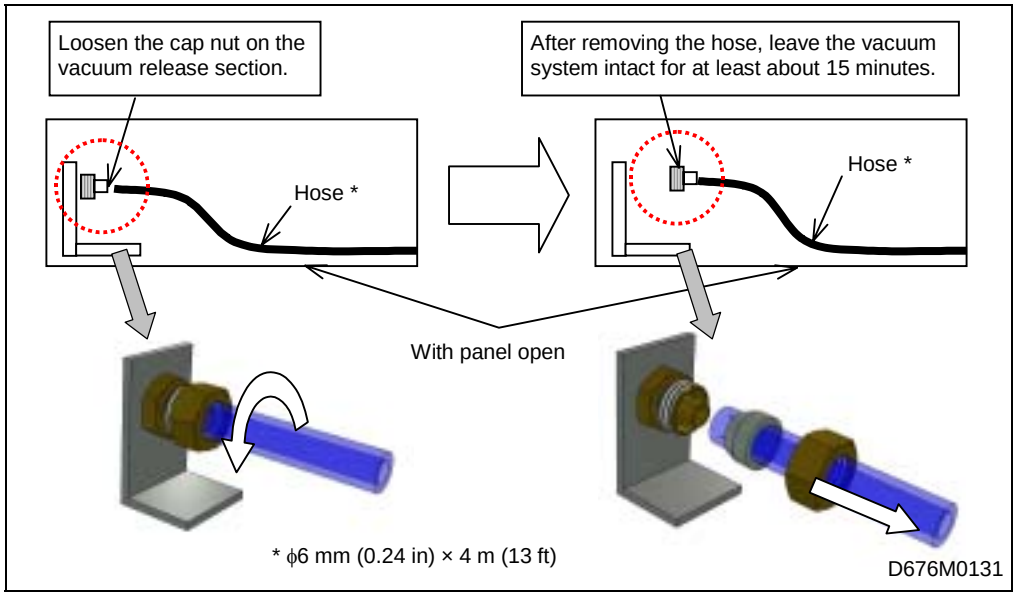

Loosen the cap nut on the vacuum release section.
After removing the hose, leave the vacuum system intact for at least about 15 minutes.
Hose *
Hose *
With panel open
* ϕ6 mm (0.24 in) × 4 m (13 ft)
D676M0131

Fig.6-4

Note: When disconnecting the hose, be careful not to allow dust to enter the hose.

(6) Disconnect the lubrication hose (12 mm or 0.47 in in diameter and 9 m or 30 ft long) from the fixing bracket.

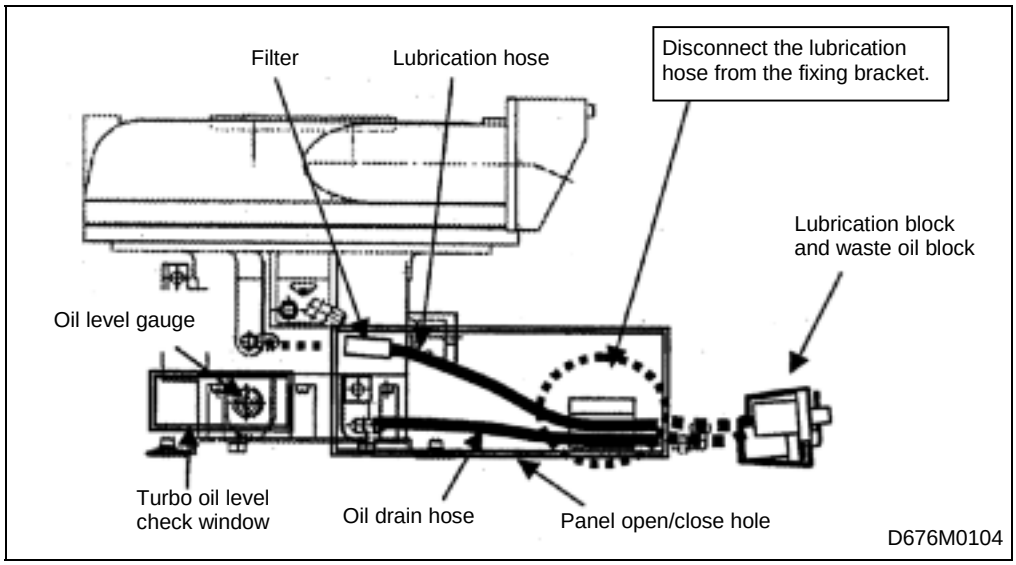


Fig.6-5

(7) Pull the lubrication block out to the front, and lift it off from the open/close hole of the panel.

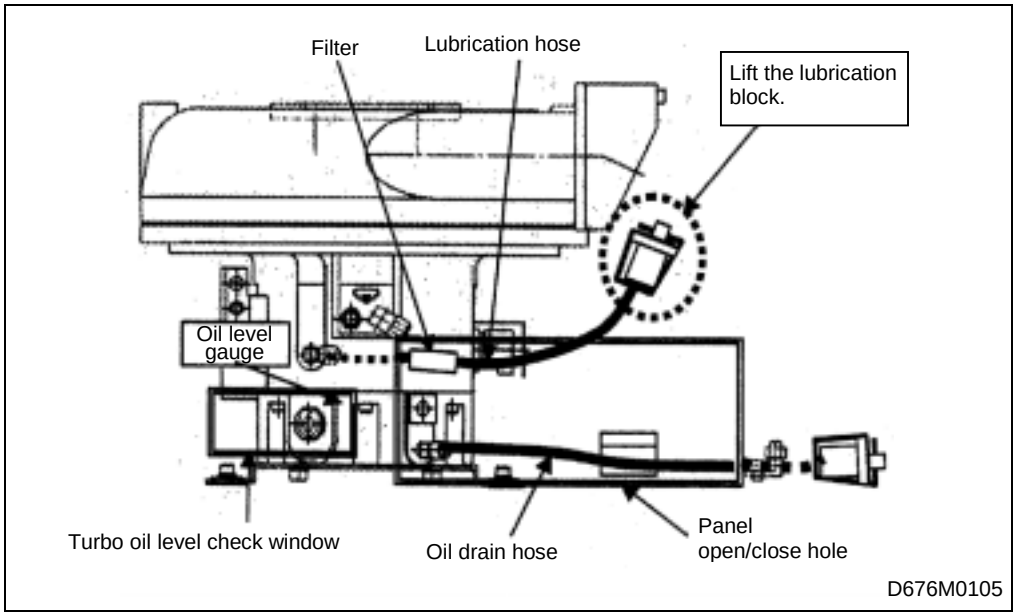


Fig.6-7

(8) Remove the lid of the lubrication block.

CAUTION

- Before unlidding the lubrication block, make sure that a time of at least about 15 minutes has passed since the vacuum pressure was released. If the lubrication block is unlidded before the vacuum release is completed, the oscillator may be damaged by the possible flow of the turbo blower oil into the vacuum system of the oscillator. Be sure to perform the above confirmation.

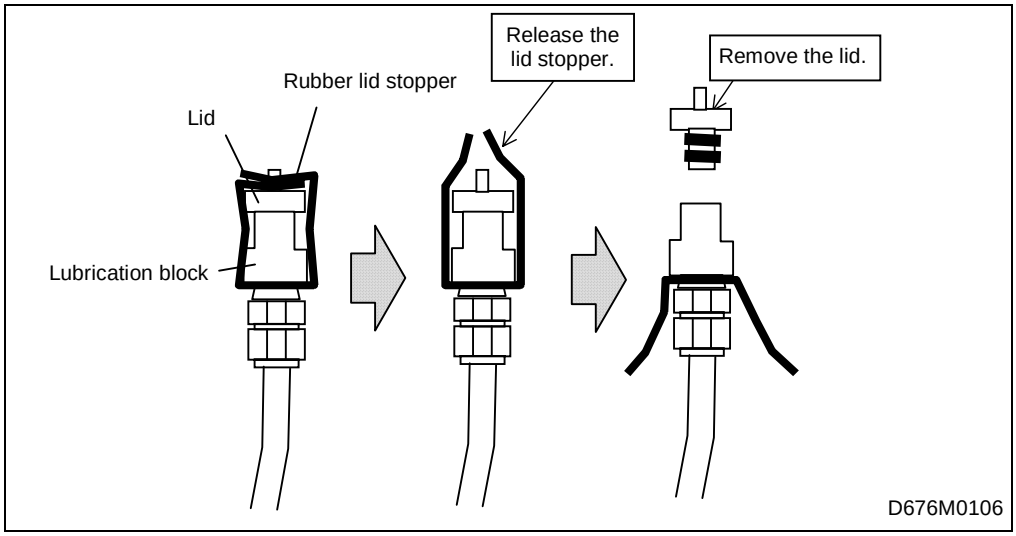


Fig. 6-8

Note: At this step, see to it that no dust sticks to the lid of the oiling port or to the O-ring or enters the oiling hose; otherwise vacuum leakage will result.

(9) Insert the bottom end of the funnel into the lubrication block.

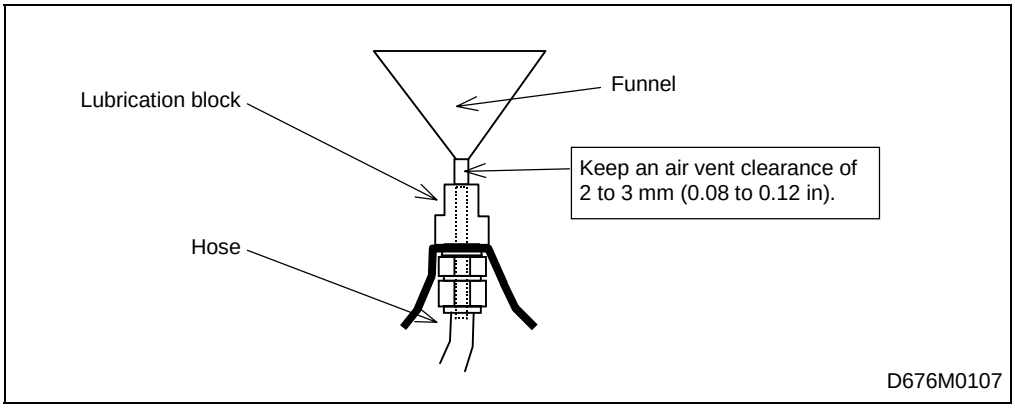


Fig.6-9

(10) Observing the oil level gauge, replenish oil for a level between the upper and lower limits.

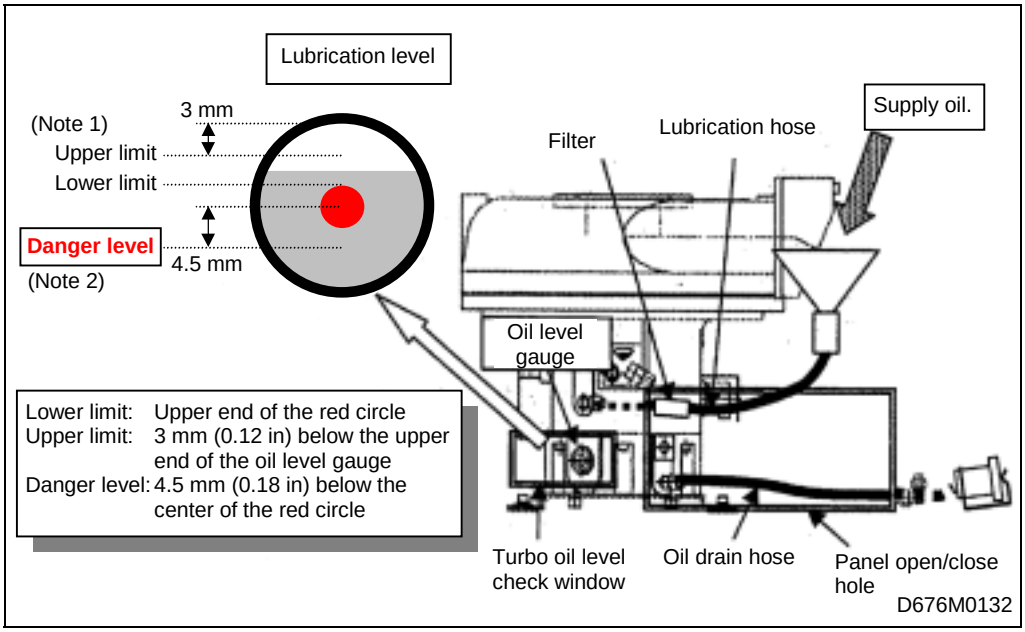


Fig.6-10

Note 1: Be sure to replenish oil for a level between the upper and lower limits. Excessive replenishment may result in trouble with the turbo blower.

Note 2: If the oil level is below the danger level, immediately replenish oil to avoid the occurrence of trouble with the turbo blower.

(11) Remove the funnel from the lubrication block, and mount the lid on the block (do not forget mounting the lid stopper).

CAUTION

- The oscillator, if operated with the lubrication block unlidded, may be damaged by the possible flow of the turbo blower oil into the vacuum system of the oscillator. Therefore, be sure to mount the lid.
- Before mounting the lid on the lubrication block, remove dirt from the side of the lid (especially, the O-rings) and the inside of the lubrication block. Dirt between the lid and the lubrication block may allow the vacuum pressure to leak from that section and oscillator damage could result.

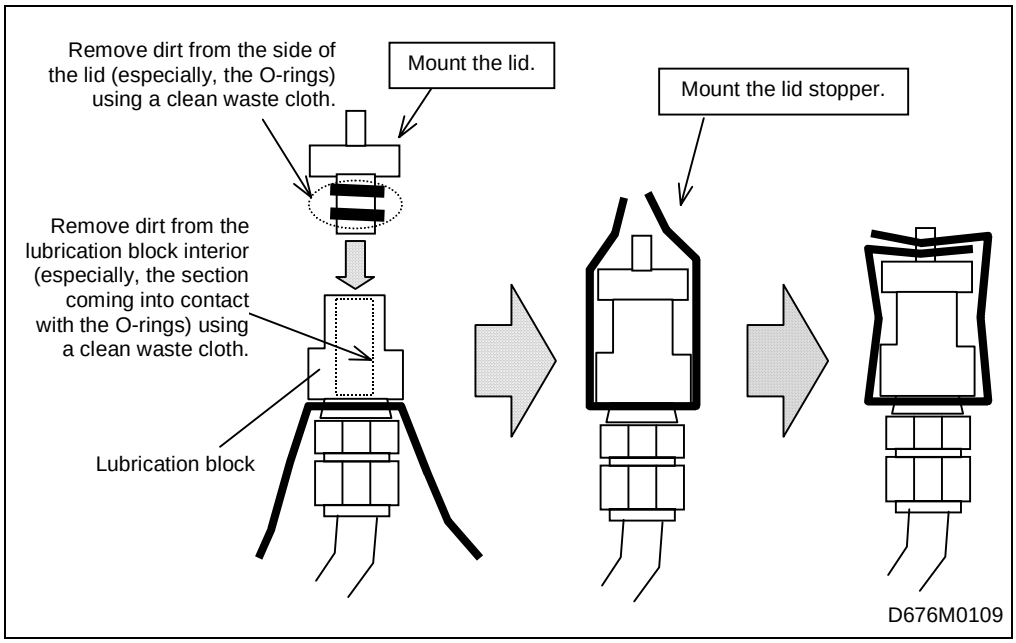

Remove dirt from the side of the lid (especially, the O-rings) using a clean waste cloth.
Mount the lid.
Mount the lid stopper.
Remove dirt from the lubrication block interior (especially, the section coming into contact with the O-rings) using a clean waste cloth.
Lubrication block
D676M0109

Fig. 6-11

(12) Replace the lubrication hose (12 mm or 0.47 in in diameter and 9 m or 30 ft long) in the fixing bracket.

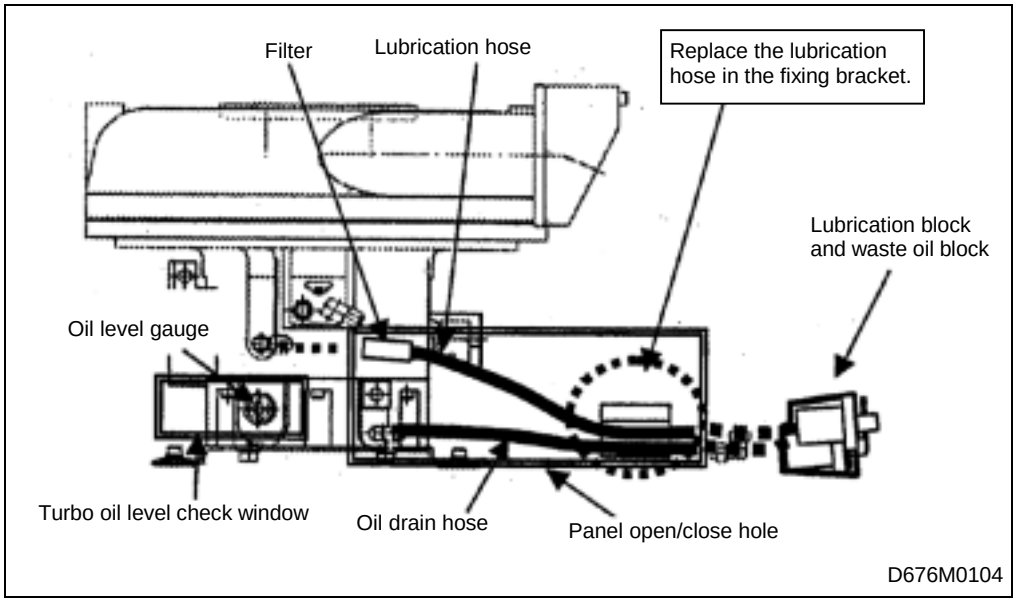


Fig.6-12

(13) Reconnect the hose (ϕ6 mm [0.24 in] × 4 m [13 ft]) on the vacuum release section. At this step, after cutting at least 20 mm (0.79 in) of the hose leading end, connect a new sleeve to the hose and then reconnect the sleeve-fitted hose itself using a reverse procedure to that of disconnection.
(Do not reuse the fastened old hose section and sleeve once they have been removed. The reuse of these sections causes the vacuum pressure to leak.)

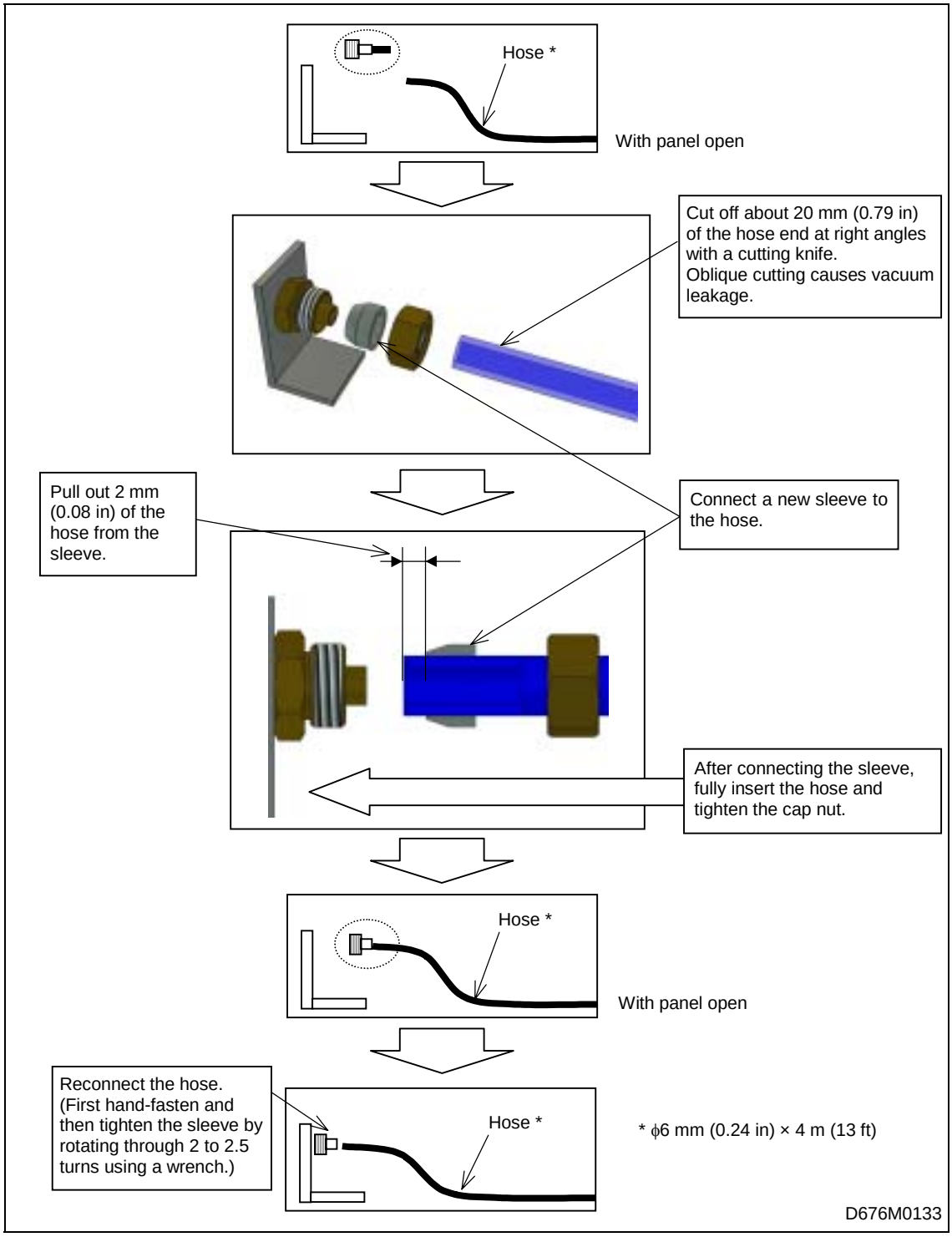

Hose *
With panel open
Cut off about 20 mm (0.79 in) of the hose end at right angles with a cutting knife.
Oblique cutting causes vacuum leakage.
Pull out 2 mm (0.08 in) of the hose from the sleeve.
Connect a new sleeve to the hose.
After connecting the sleeve, fully insert the hose and tighten the cap nut.
Hose *
With panel open
Reconnect the hose. (First hand-fasten and then tighten the sleeve by rotating through 2 to 2.5 turns using a wrench.)
Hose *
* ϕ6 mm (0.24 in) × 4 m (13 ft)
D676M0133

Fig. 6-13

(14) Mount the removed panel.

6-3 Water Supply to Chiller

(1) Open the water supply door of the chiller.

(2) Supply water till the water level goes up to the level between F and E of the liquid elvel gauge.

The following is to be done after the laser machine is activated:

(3) Start operating the chiller and wait for 10 minutes.

(4) See the liquid elvel gauge and replenish oil if it lacks.

(5) Cehck the water pressure [0.34-0.44 MPa (3.5-4.5 kg/cm^2, 50-64 psi].

7 STARTING THE LASER MACHINE

Important : The following items must be done after the items in Chapters 2 to 6 have been finished.

(1) Check the power voltage and the phase descrived in “5-2 Checkpoints before Electric Power Work”.

(2) Supply the main power.

(3) Start NC.

(4) Return the axes home.

(5) Carry out 6-2, (3).

Note : The outside optical path system adjusting method is the same as for ST-X Mk-II series (1.5/1.8 kW or 2.0.2.4 HP).

For the adjusting method, refer to the separately supplied adjusting procedure.

8 Adjustment of external beam path

Adjustment of external beam path is the same as ST-X Mk-Ⅱ series.

Please refer to the adjustment manual(オ MCPG1D11242E).

9 Adjustment of Opti-pod

9-1 Adjustment of ANC

(1) **Mounting the adjuster (jig)**

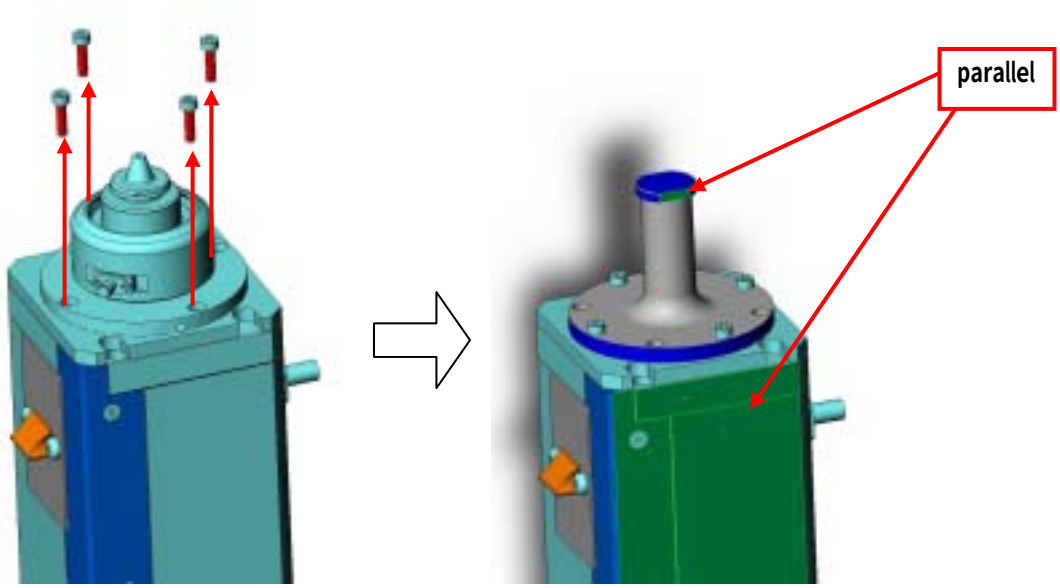
(**i**)Remove the non-contact profiling cable.

(**ii**)Remove the four bolts.

(**iii**)Remove the nozzle.

(**iv**) Mount the adjuster (jig)

(Note)Make sure that the notch runs parallel with the side on which the non-contact profiling cable are arranged.



(2) Procedure for mounting the torch

Mount the torch in accordance with the figure below.

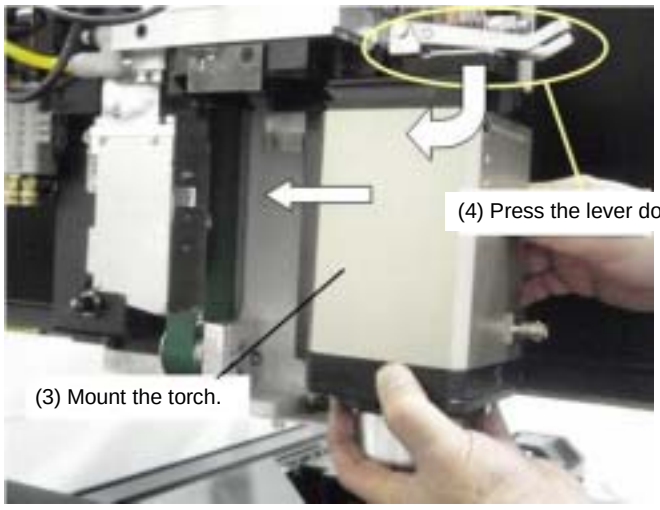
(1) Return the Z-axis to its home position.

(2) Make sure that the TORCH DISMOUNT switch is valid (set to the **I** position).

(3) Mount the torch at the position shown in **エラー! 参照元が見つかりません。**.

(4) Press the lever down to secure the torch.

(5) Make the TORCH DISMOUNT switch invalid (set to the **O** position).



(3) Setting up the nozzle station

(**i**)Move all axes to the respective home positions.

(**ii**)Press the SWITCH button on the NC operating panel one time.

(**iii**)Select “ATC Cover Open” on the screen to open the cover.

(**iv**)Select “Nozzle Holder Up” to move the nozzle station upward.

(**v**)Select “Nozzle Unclamp” to deactivate the clamper and thus free the nozzle.

(4) Measuring the machine coordinates of the holder

Follow the procedure below to measure the machine position of the holder:

(**i**)Keep the holder as level as possible (checking can be visual).

(**ii**)Adjust the position of the adjuster (jig) so that its front end fits into the holder. At this time, match the front end of the adjuster (jig) and the holder for a uniform clearance between both (checking can be visual).

(**iii**)Move the Z-axis vertically to make sure that the floating section (holder top) does not move in the XY-plane.

(**iv**)Change the screen to one in which the Z-axis current of the servomotor can be observed.

(1)Press the SYSTEM button on the NC operating panel one time.

(2) Press the F7 key (third function key from right).

(3) Key in “959316” and press “INPUT”. The F7 lamp will then be highlighted. (Pressing the F7 key again clears the highlighting).

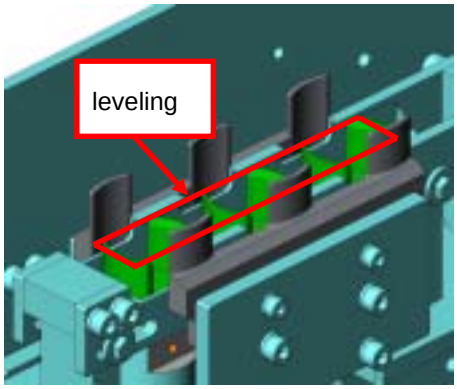
(4) Press the SYSTEM button twice to select the SERVO screen.

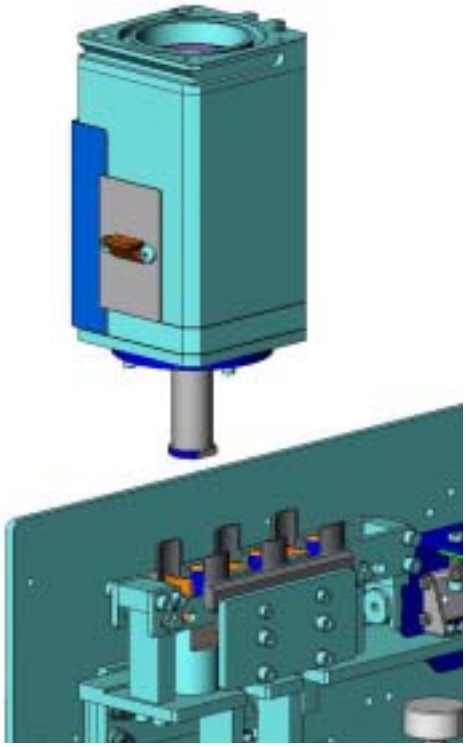
(5)Check the Z-axis current value of the servomotor (Z-value under CURRENT).

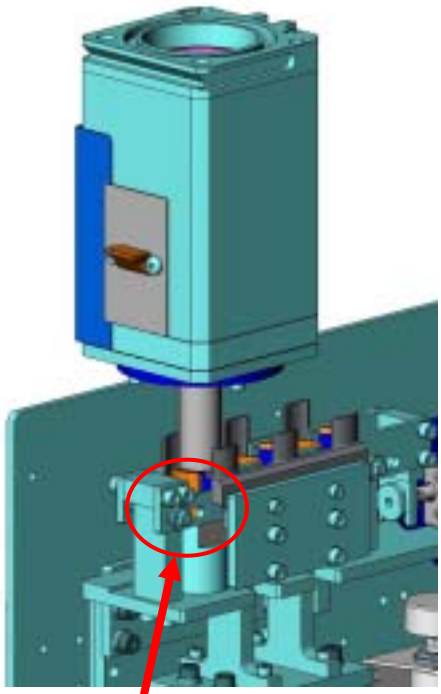
(**v**)While observing the Z-axis current value, lower the Z-axis in steps of ×100 pulses with the manual pulse control handle, and stop the lowering operations immediately after the current value has changed by about 1 A.

(Note)Operate the pulse handle in intervals of several seconds to allow the current value to be stabilized.

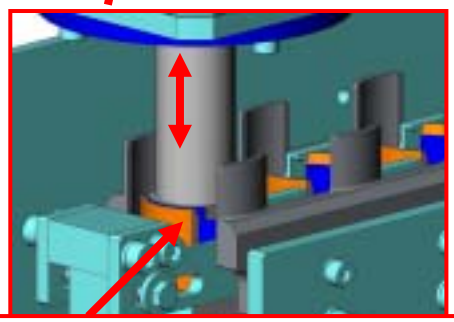
(**vi**) Record the X-, Y-, and Z-coordinates displayed as “Machine Position”.







step (vi)



(**iii**) Move the Z-axis vertically to verify that the floating section does not move.

(5) Parameter Setting

(ⅰ)Press the SYSTEM button to select PARAM screen.

Press SELECT, then select INTEL_MC, and press CONFIRM.

(**ii**)Enter the coordinates that were recorded in Subsection (4), step (vi), under "INTEL_NZL_∗_POS." (The ∗ mark refers to the number of the measured holder.)

Example: Enter the coordinates under "INTEL_NZL_3_POS." if the holder shown as 3 in the photo below were measured.

(Note)As for the Z-axis setting, subtract the recorded Z+ coordinate by 0.5 (mm). This keeps the torch-to-holder distance constant during ANC operation.

(Example)Enter Z=–95.6+1.0=-95.1 if the recorded Z-value is –95.6.

(3) Set parameters similarly for the remaining two holders.

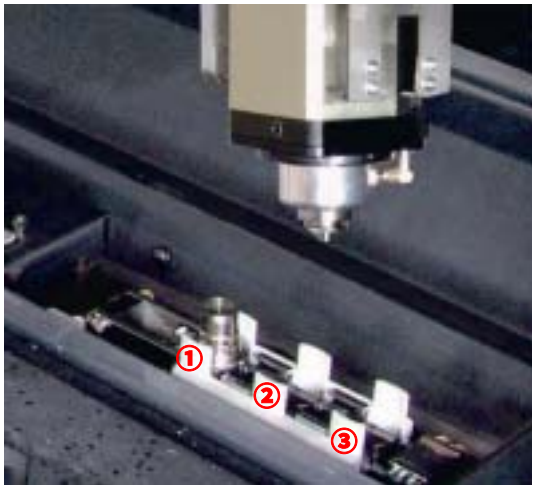
(6)Operational Check

Note1:Before checking operation, be sure to perform the nozzle station adjustments described in Chapter 3.

Note2:Before checking operation, be sure to replace the adjuster (jig) with the removed nozzle.

Check the state of the torch and nozzle in the COMMAND screen and make sure that the nozzle does not remain mounted. (Select COMMAND first and then TOOL.)

Interchange all nozzles from 1 to 3 to verify that the ANC operation is proper.



9-2 Adjustment of Nozzle cleaner

(1) Adjust Speed of Rotation

There is the rotary speed adjustment volume to a router.

Turn the Volume, and adjust to the center within the range of setting.

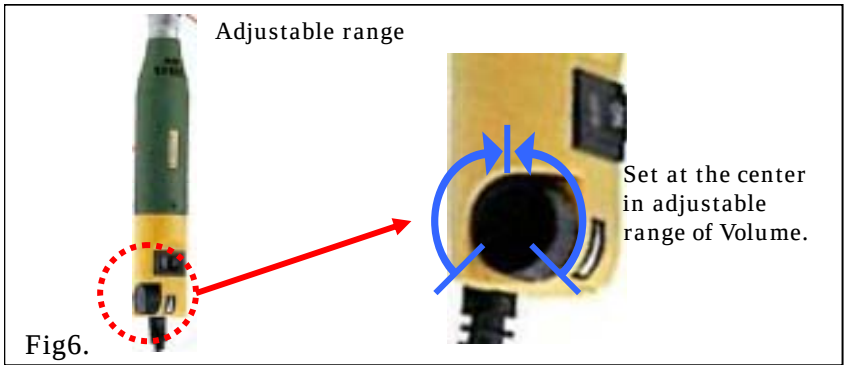


Fig6.

(2) The height adjustment of the nozzle

Move the X- and Y-axes to the center of the Grinding Bits, and move the Z-axis to a position at which the upper end of the grinder and the nozzle end come into contact (see the Note below for this position). Assign the machine coordinates of each axis at this time to the TOOL DATA screen. For the assignment method, refer to the MAZATROL RPEVIEW Operating Manual, Section 3-17, “Modifying the User Parameter Setting (Nozzle Position Data)”.

Take this recorded position as a reference position.

Note: Place a copy sheet on the Grinding Bits, lower the Z-axis in handle mode (×10), and take the position where the sheet gets stuck between the nozzle and the Grinding Bits, as a contact position.

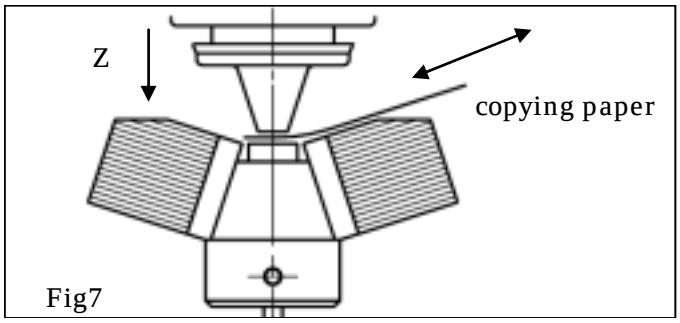


Fig7

(3) Nozzle-centered adjustment

Moved to the "-X" direction to the position where a brush is not by the Grinding Bits center.

Lower the Z-axis by 6mm from Z-axis coordinate value and turn with a nozzle cleaner.

① move it in the "+X" direction and record the coordinate of the position equal to the brush.

② The "-X" direction records the coordinate of the position equal to the brush likewise, too.

"(① + ②) /2 "becomes the X-axis coordinate value and inputs a coordinate into tool data.

The Y direction inputs it in search of a coordinate value likewise, too.

(The position where the brush is judged from the change of the sound.)

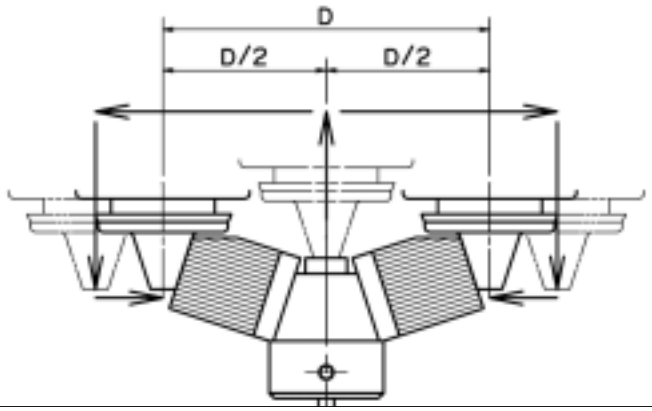


Fig8

Note Cannot clean all aspects when neglect this adjustment.

(4) Check the parameter

Set **L046, L047** of the parameter to 0.

Par No	Name	Unit	Value
L046	ノズルブラシあて量 Y / Nozzle Brush Fit Y	mm	0
L047	ノズルブラシあて量 Z / Nozzle Brush Fit Z	mm	0

(5) Check the motion

Instruct in "G22C1" by MDI, and confirm whether the touch of the Grinding Bits and the brush to the nozzle.

Confirm the content of “2" and “3" again, when Nozzle don't touch the Grinding Bits and the brush.

(6) Adjusting the brush contact amount precisely

In cases such as brush wear, the contact amount between the brush and the nozzle can be adjusted using the required user parameters.

Par No	Name	Unit	Setting range
L046	Nozzle Brush Fit Y	mm	-2≦L046≦2
L047	Nozzle Brush Fit Z	mm	-2≦L047≦2

To increase the contact amount between the nozzle and the brush, assign minus data to the parameters.

To reduce the contact amount between the nozzle and the brush, assign plus data to the parameters.

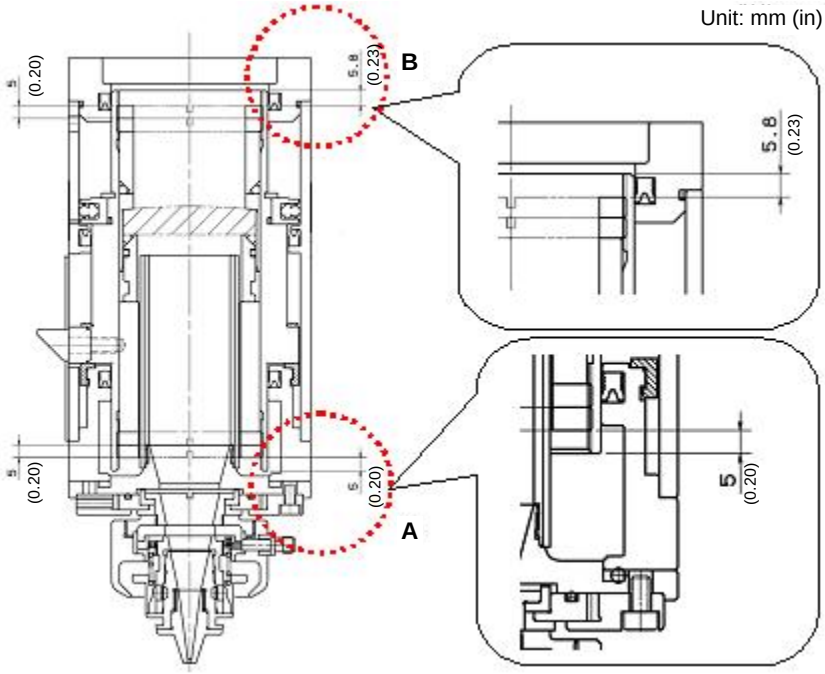
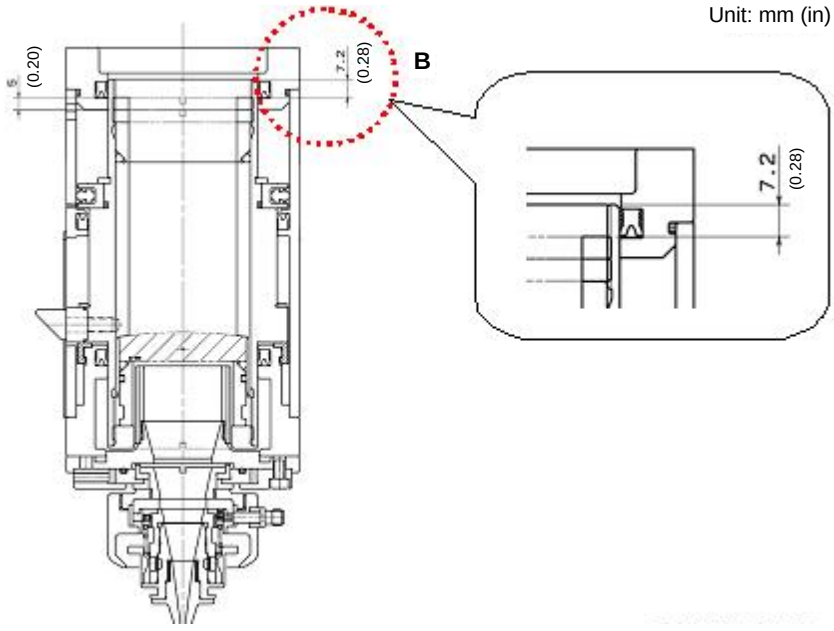
Note: Replace the brush if wear exceeds a predetermined level.

9-3 Adjustment of blue flame

(1)assemble of torch

The lens is put in the torch.

NOTE: In the blue flame sensor, it is judged the lens installation mistake when the focus position shifts greatly, and the alarm stops. The assembly of the torch is checked, and it is checked whether at the position where the lens is correct.

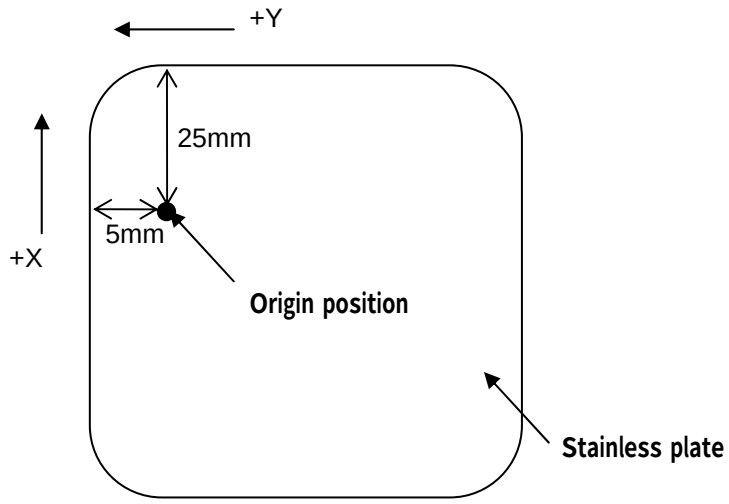
	Assembly drawing
7.5" Mazak High Accuracy Auto Centering Lens (Withstand pressure: 2.0 MPa, Lens end thickness: 0.38 in)	Unit: mm (in)  D614M0319
5" Mazak High Accuracy Auto Centering Lens (Withstand pressure: 2.0 MPa, Lens end thickness: 0.38 in)	Unit: mm (in)  D614M0320

(2)Adjustment of blue flame origin position X and Y

1.The machine go to the following position on the plate for blue flame.

2.You read the X and Y position on the command screen, then set the value to the following parameters.

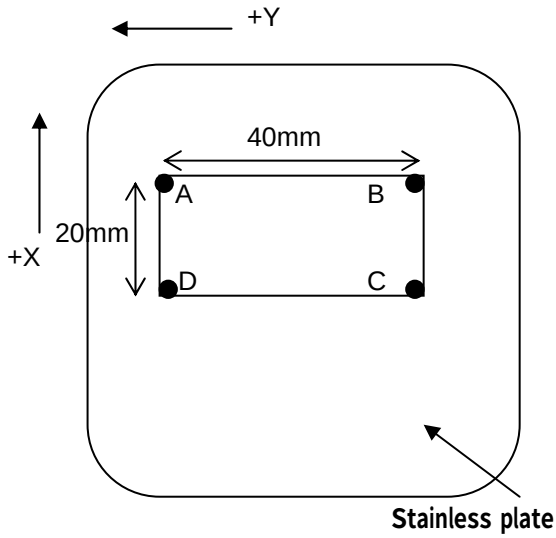
J370	**Blue Flame Origin Position X**
J371	**Blue Flame Origin Position Y**

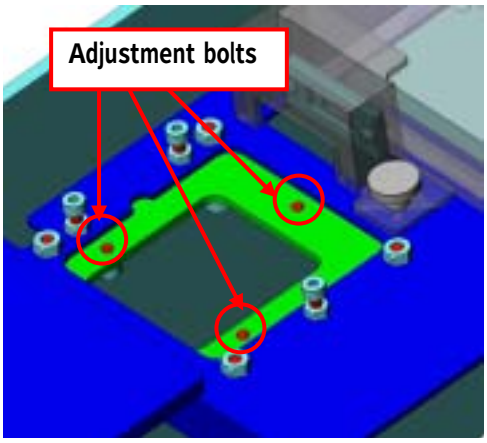


(3)Stainless Plate level adjustment

You measure the Z axis height of four point(A,B,C,D), then max different should be within 0.1mm. In the case nozzle touched material.

NOTE: You can use any torch and nozzle when you measure.





(4)Adjustment of Z axis height in Stainless plate.

You need to measure height of each torch in advance, because little different of height.

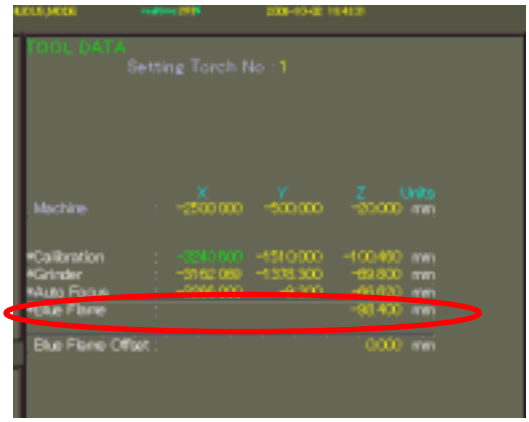
How to measure is as follow

(**i**)Axis go to blue flame origin position X and Y.

(**ii**)Measure height of torch.(NW=0). In this case, any nozzle OK.

(**iii**)Please check to fix nozzle correctly when you measure height.

(**iv**)You set the Z axis position values you measured into the parameter as follows



(5)Cutting Condition Adjustment

The shipment setting is done by laser output of 750W150Hz15% in MAZAK.

For most customers, Blue flame Sensor function works effectively by this power setting.

It solves the problem if you set "L075" to 1000 in that case.

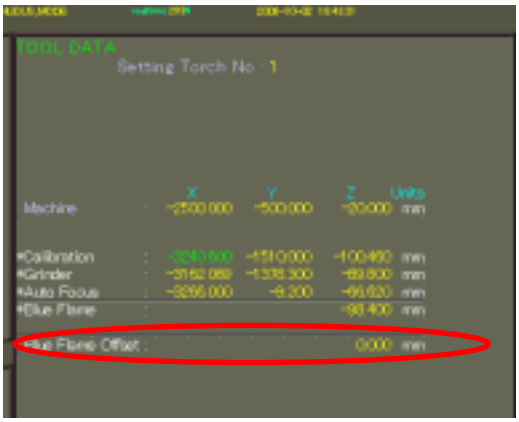
L075	**Blue Flame Laser Power**	**750**
L076	**Blue Flame Laser Frequency**	**150**
L077	**Blue Flame Laser Duty**	**15**
L078	**Blue Flame Laser Gas Pressure**	**0.1**

(6)Blue Flame Shift

There is a case where the value of the focus measured with the blue flame sensor shifts because of the illumination etc. (Shift without fail stabilizing)

In this case, the value is put in the following shift values and shifts.

Please give as "0" usually.

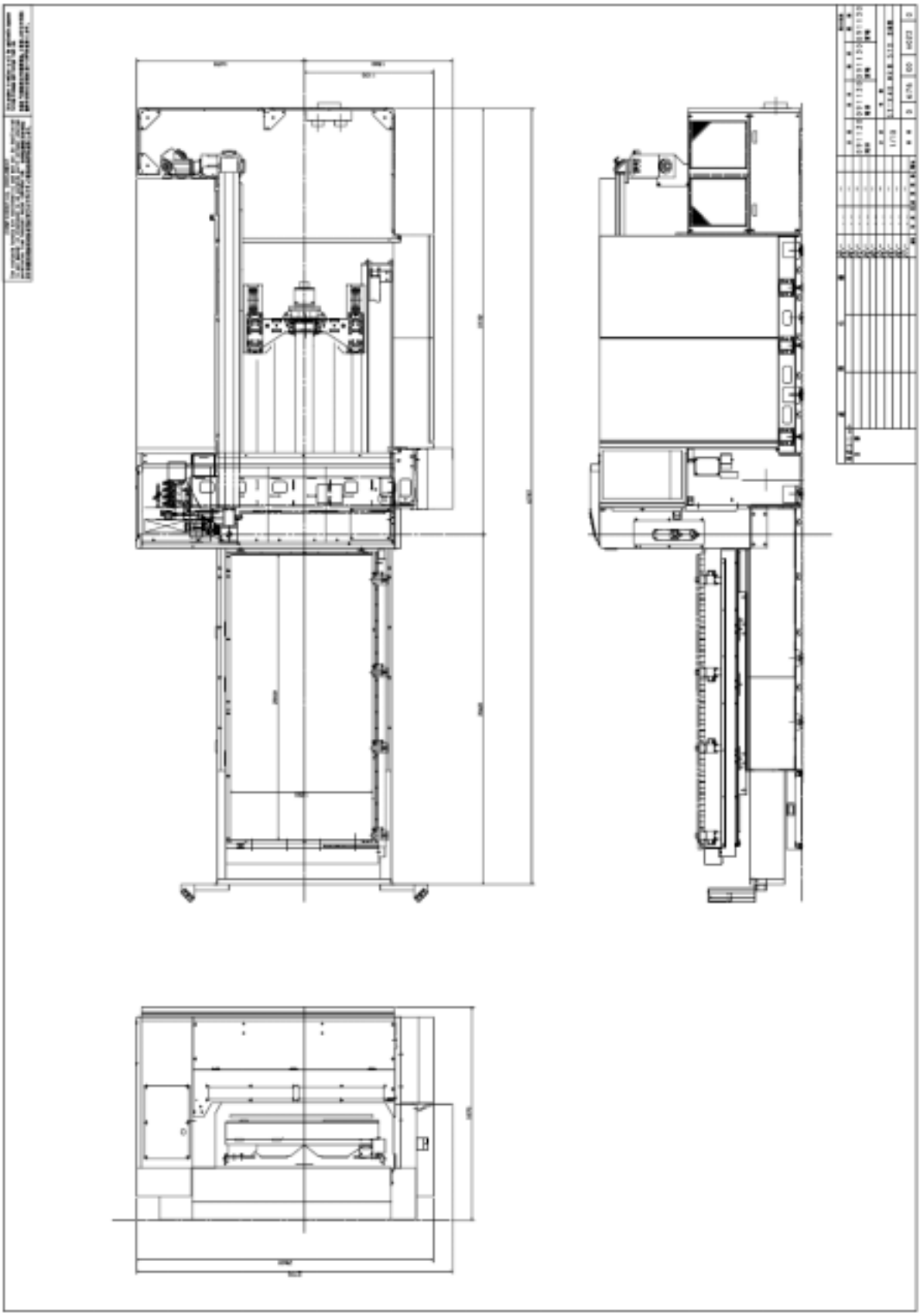


10 ATTACHED MATERIALS

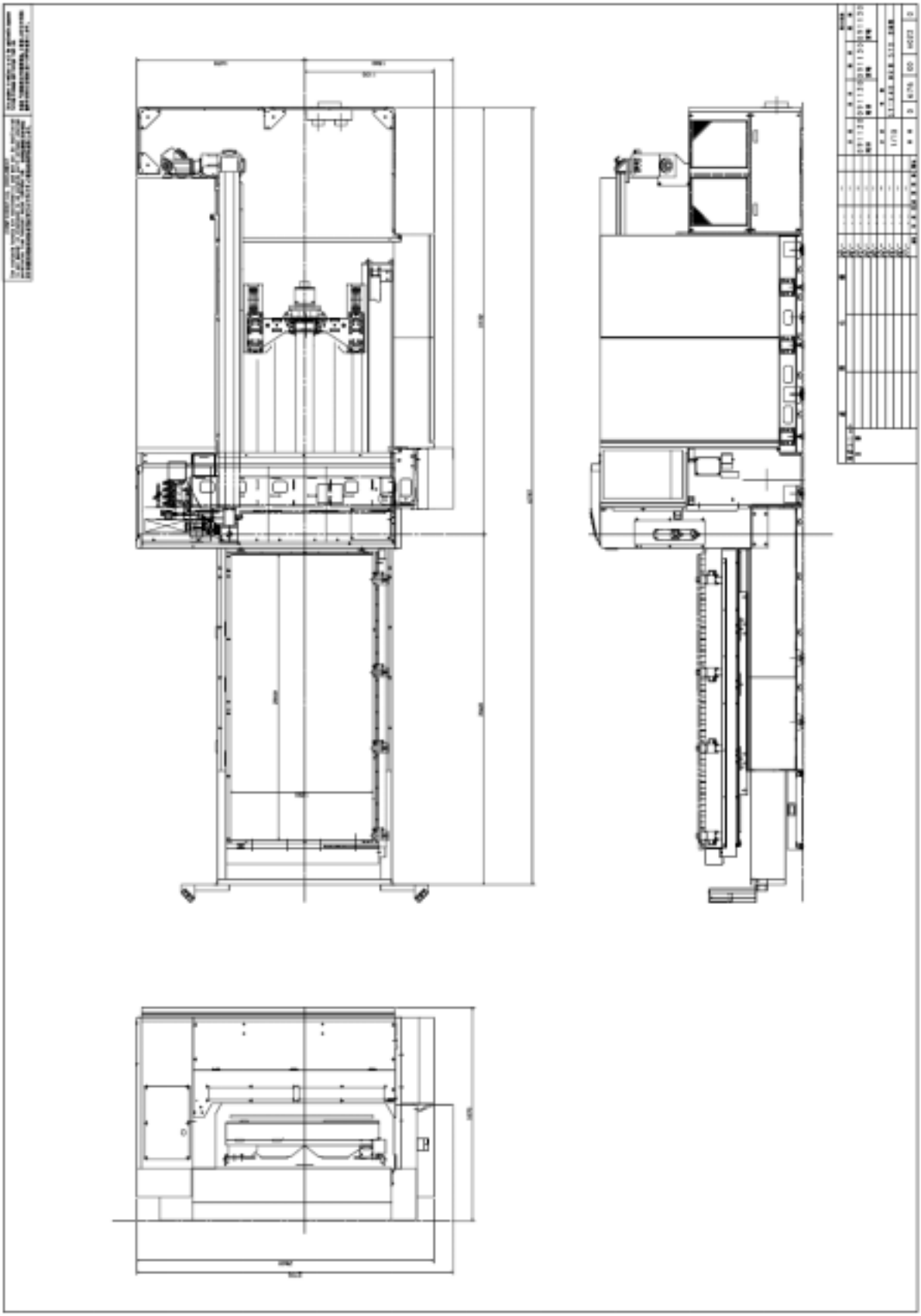
10－1 Overall views
10－2 Foundation drawing
10－3 Layout
10－4 Slinging part drawings

10-1 Overall Views

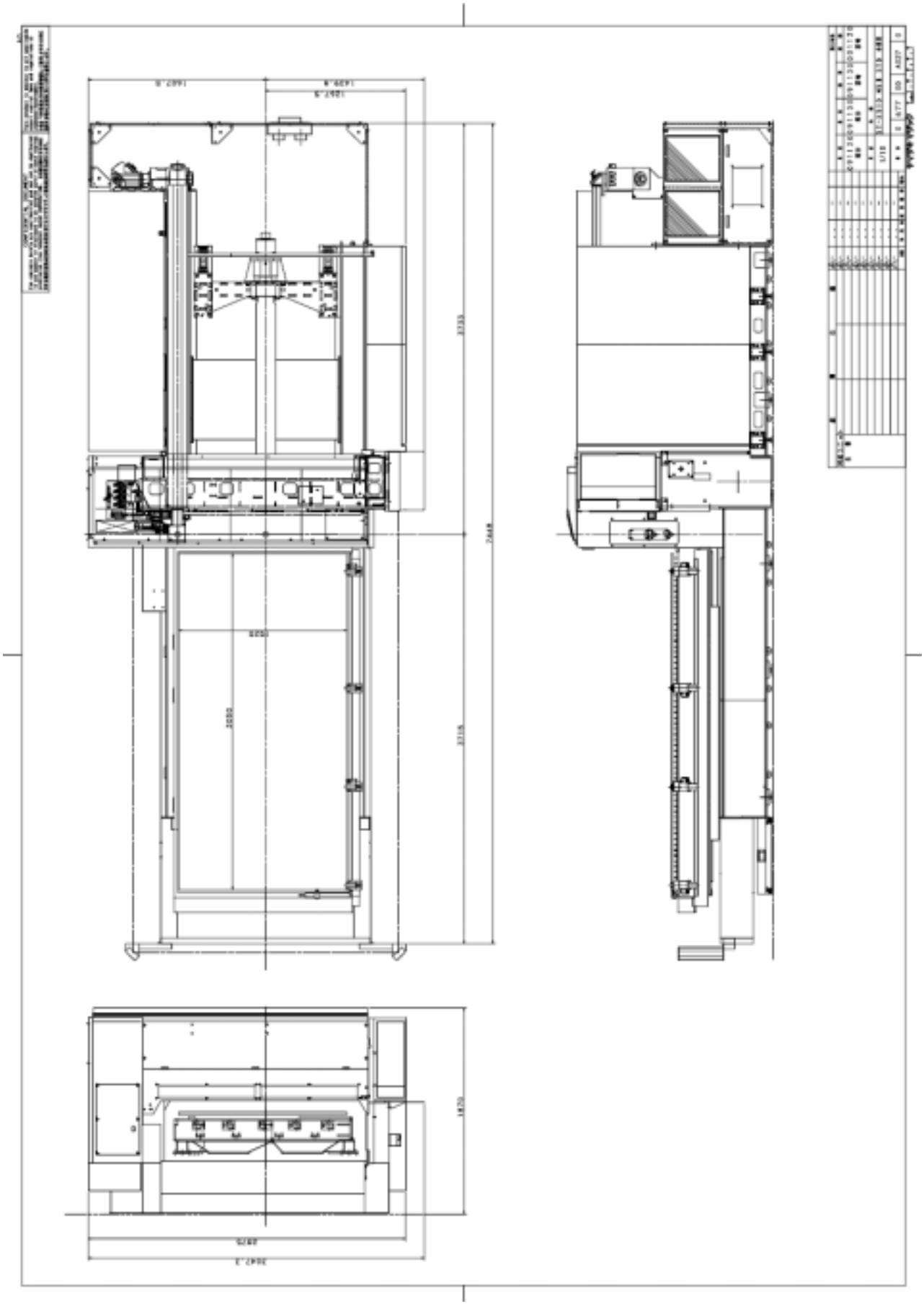
STX 48 Mk**III**



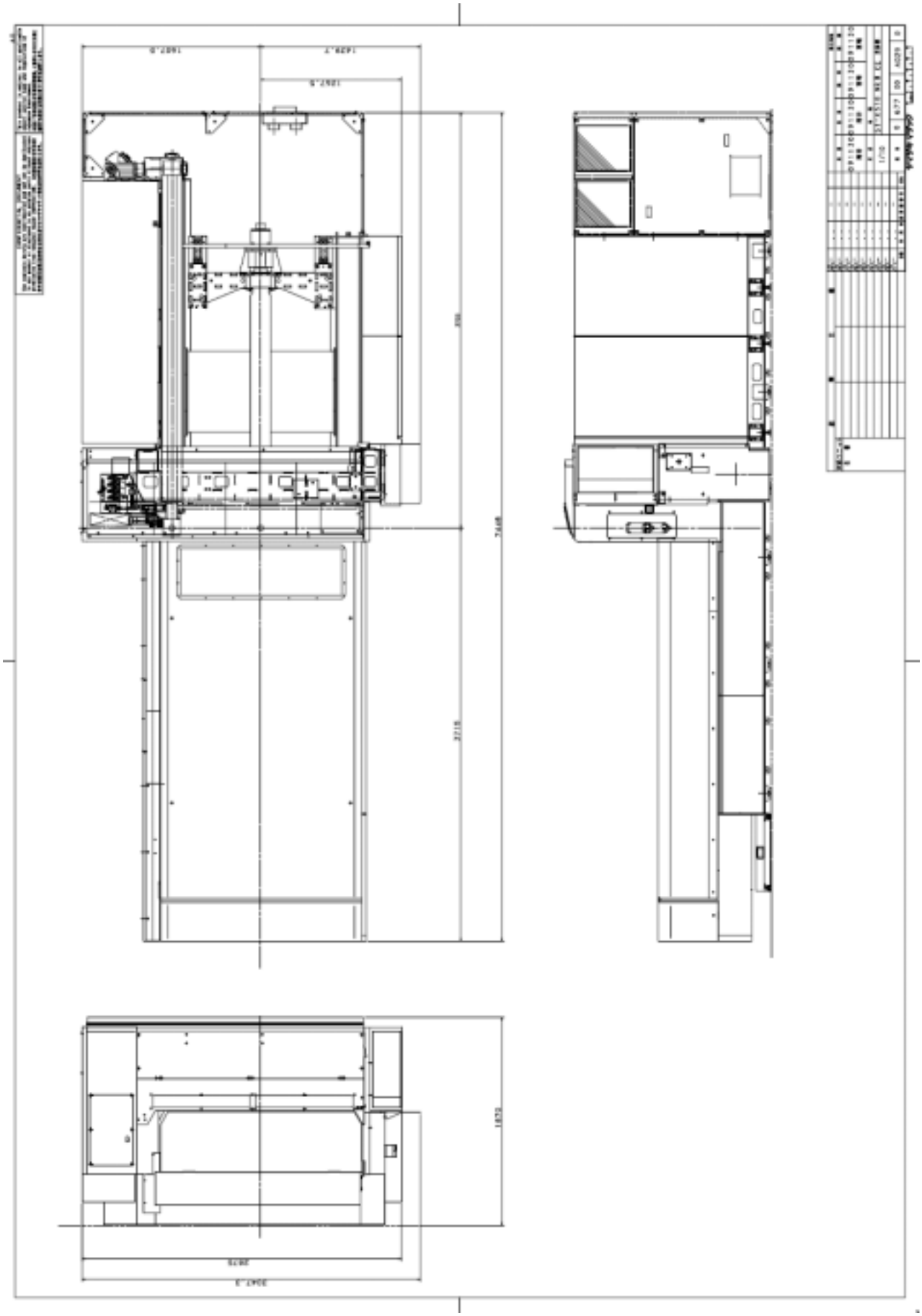
STX 48 Mk**III**(automatic cover equipped)



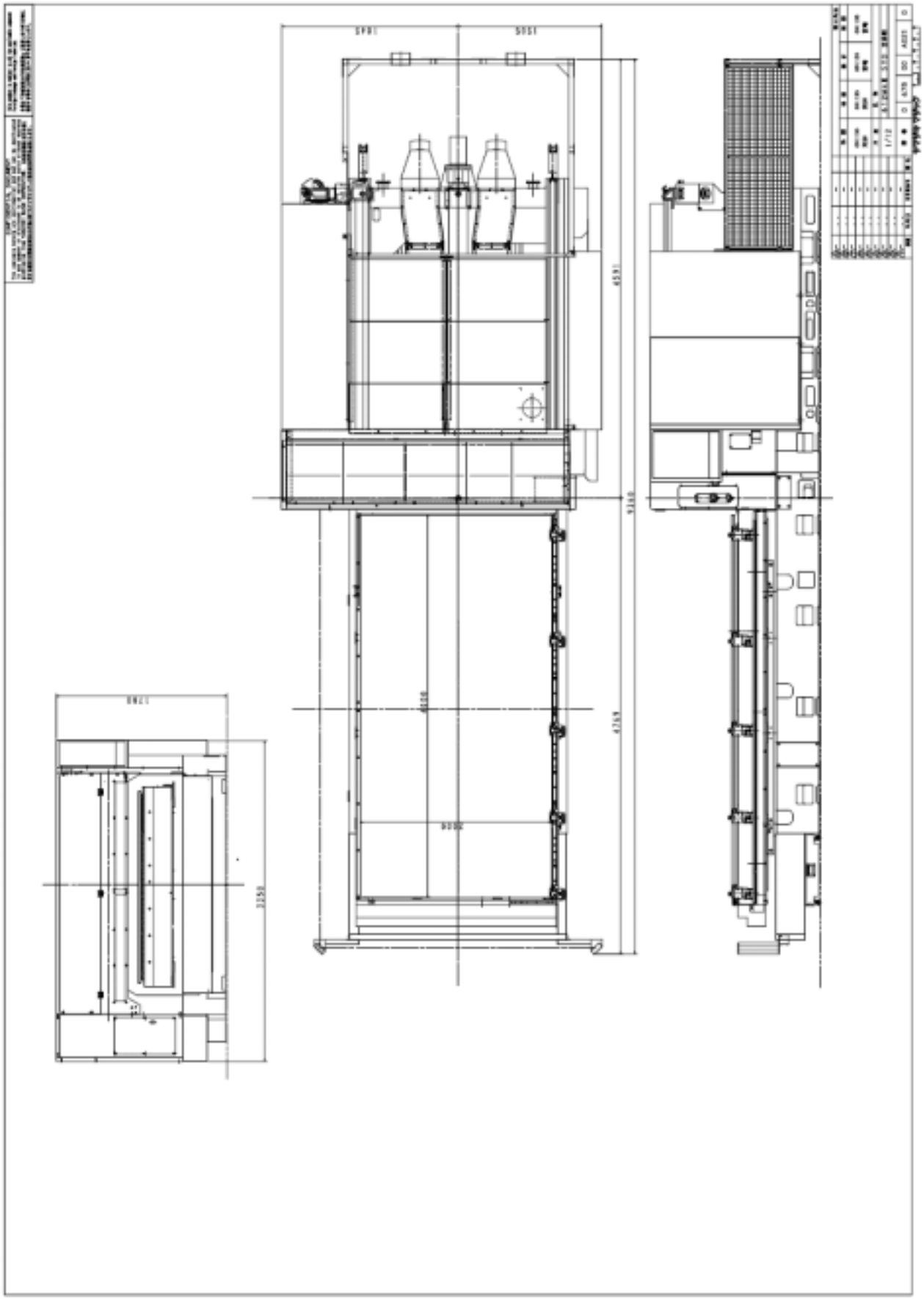
STX 510 MkIII



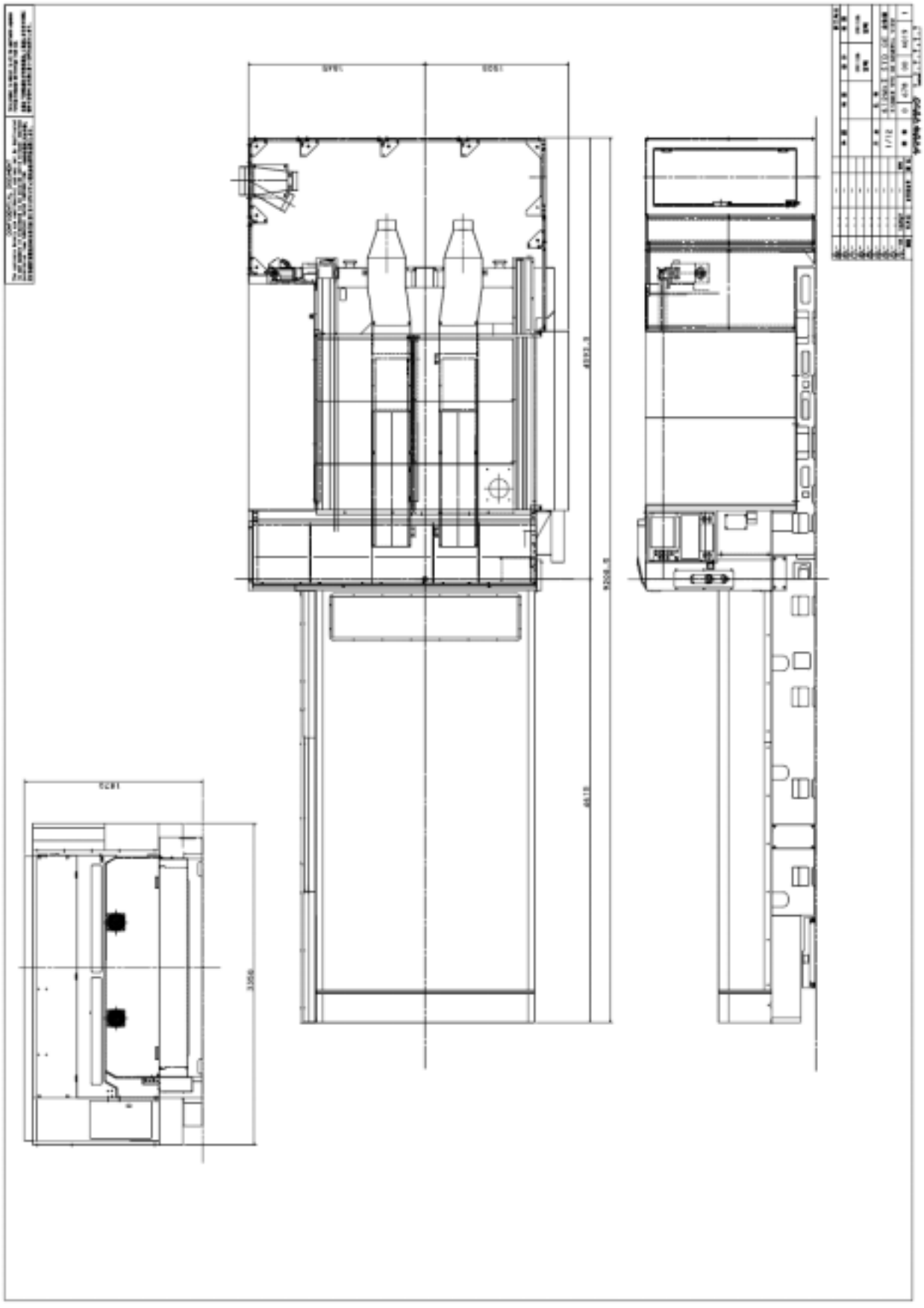
STX 510 Mk**III** (automatic cover equipped)



STX612 MkIII

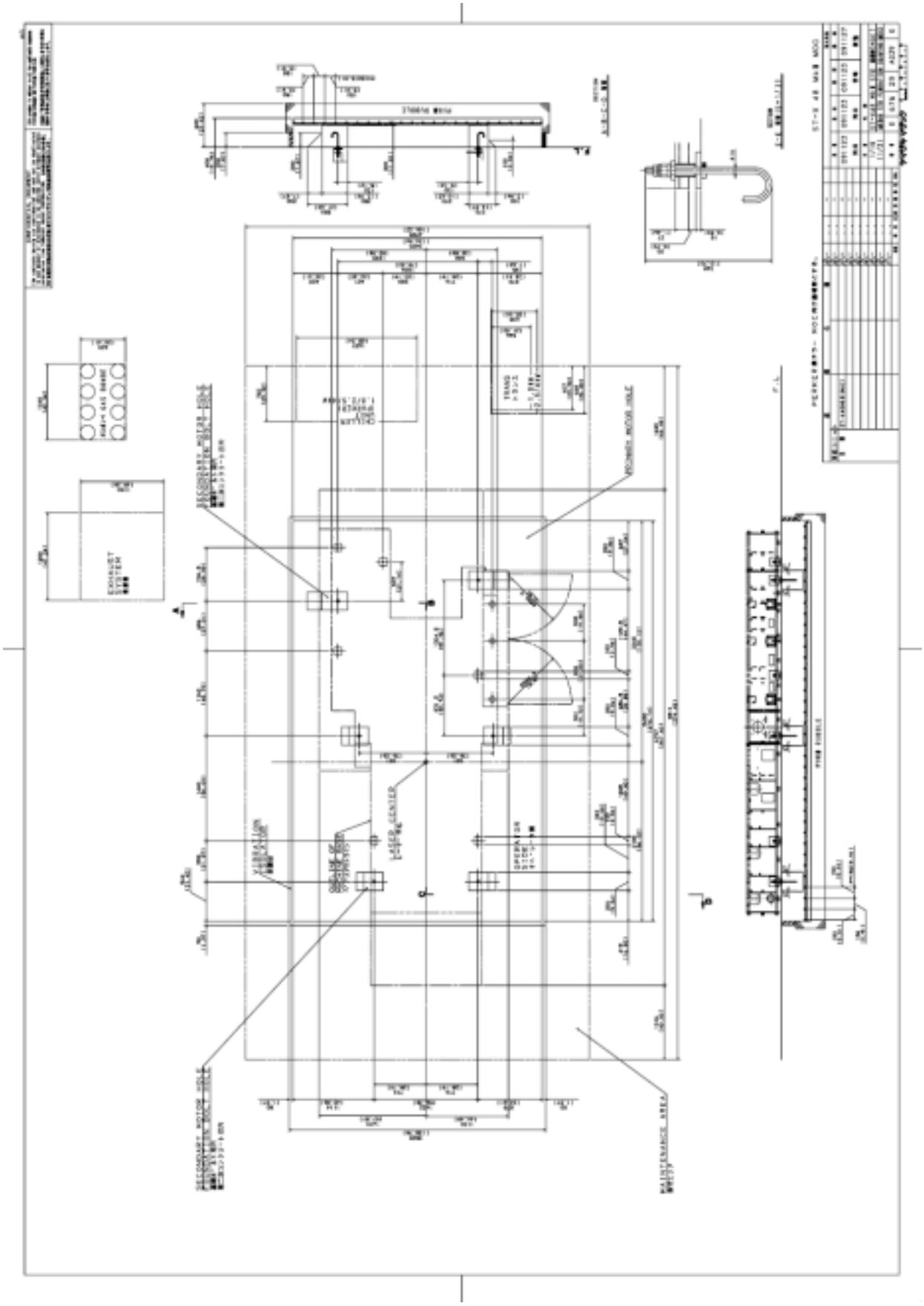


STX 612 Mk**III** (automatic cover equipped)

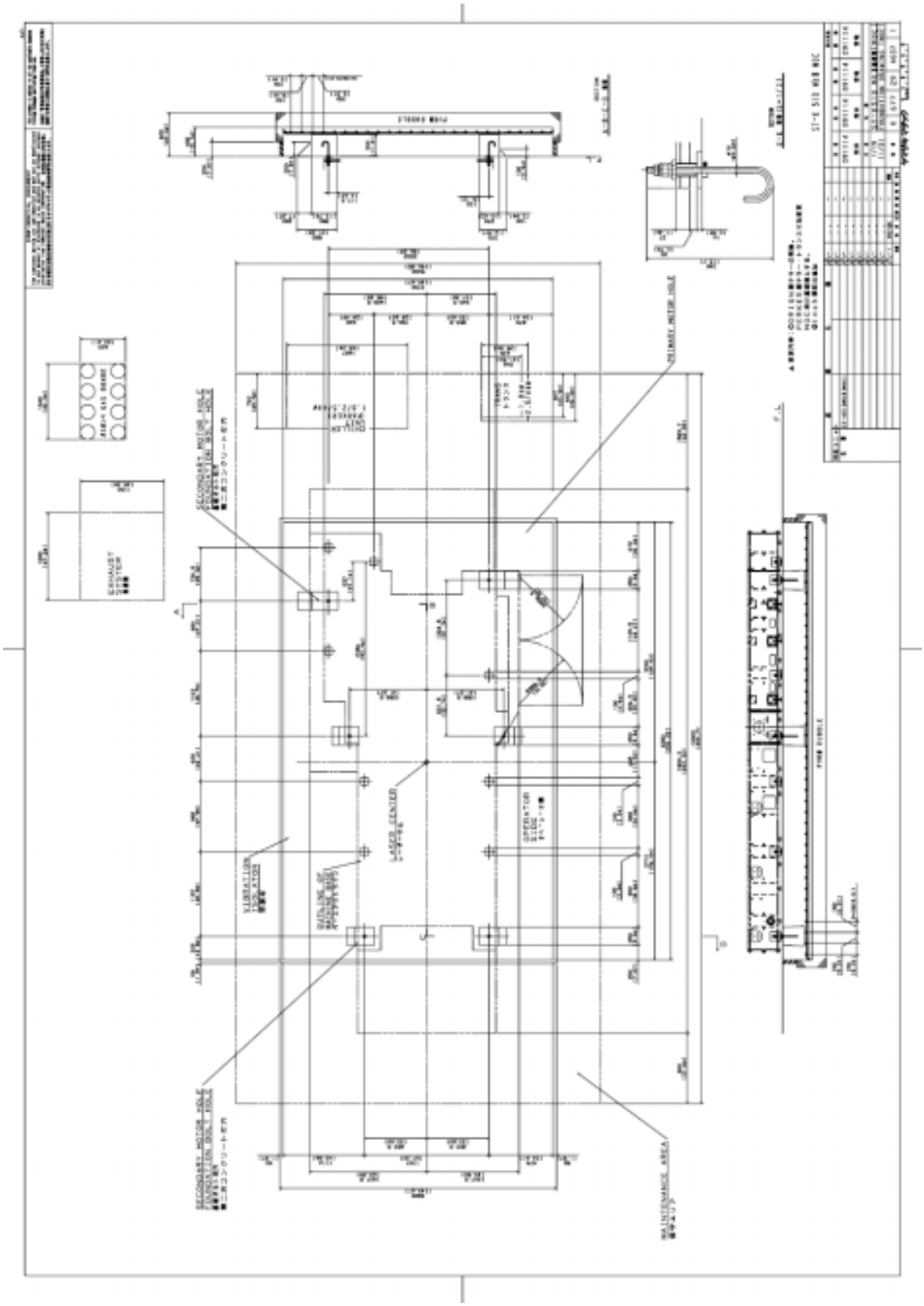


10-2 Foundation Drawing

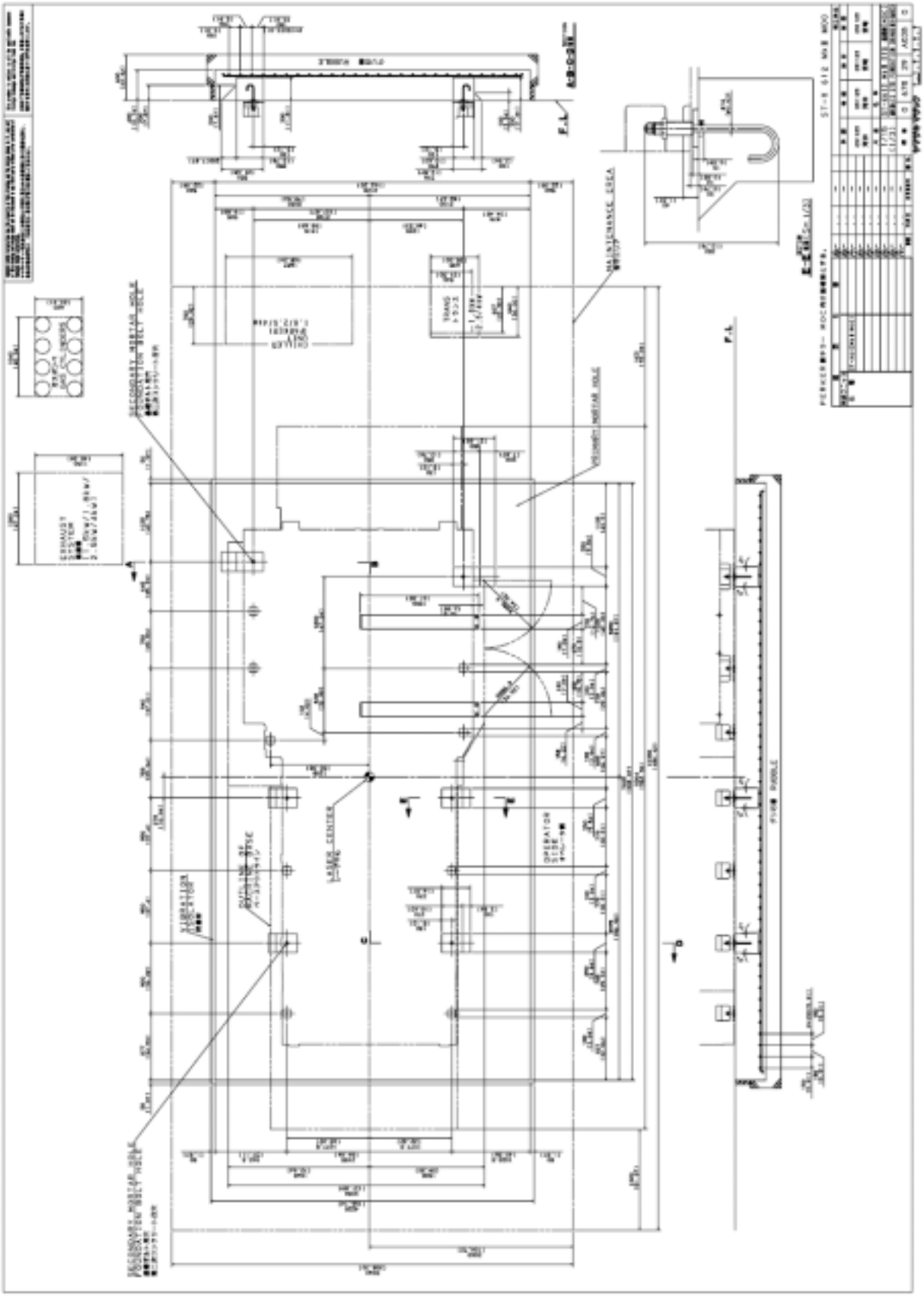
STX 48 Mk**III**



STX 510 MkIII



STX 612 MkIII



10-3 Layout

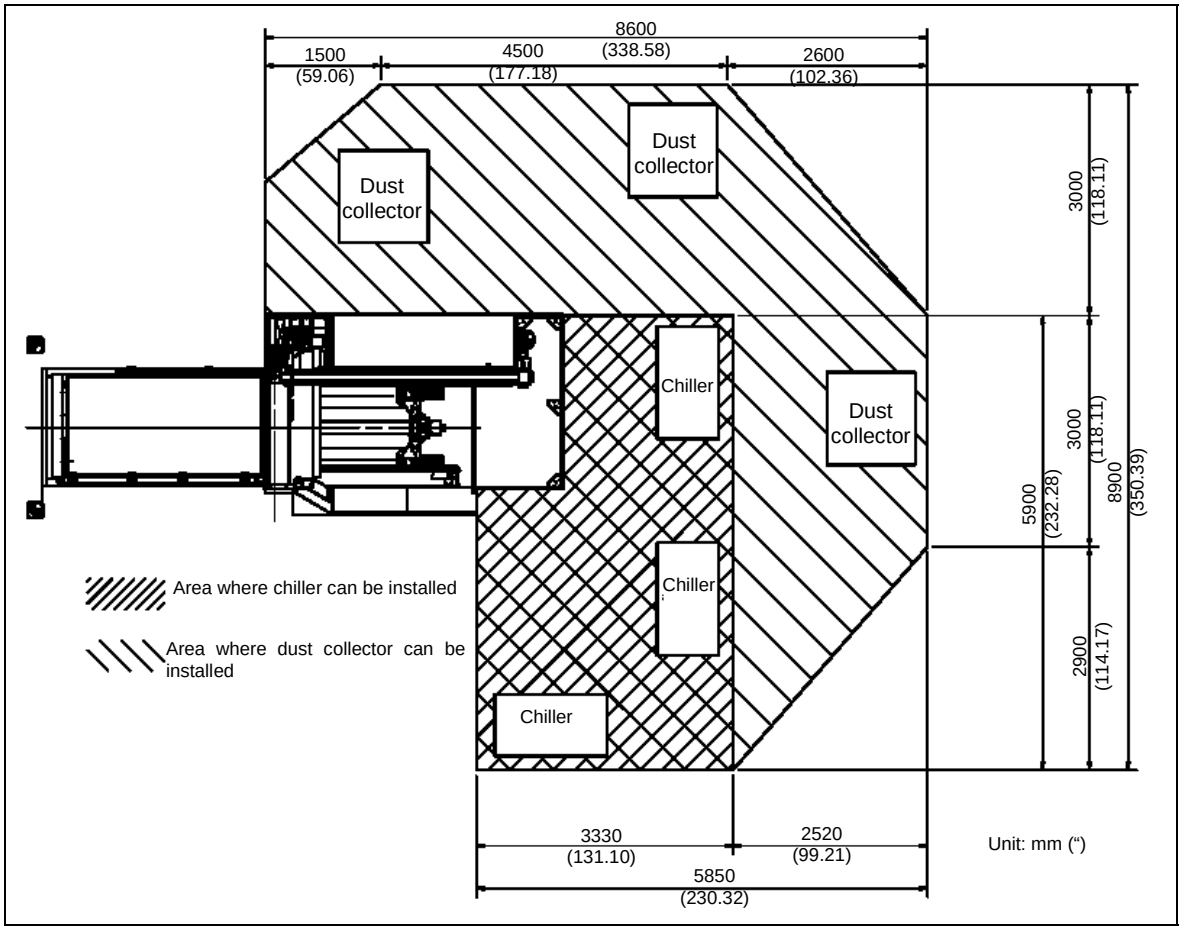


Fig. 10-1 Layout

10-4 Slinging Part Drawings

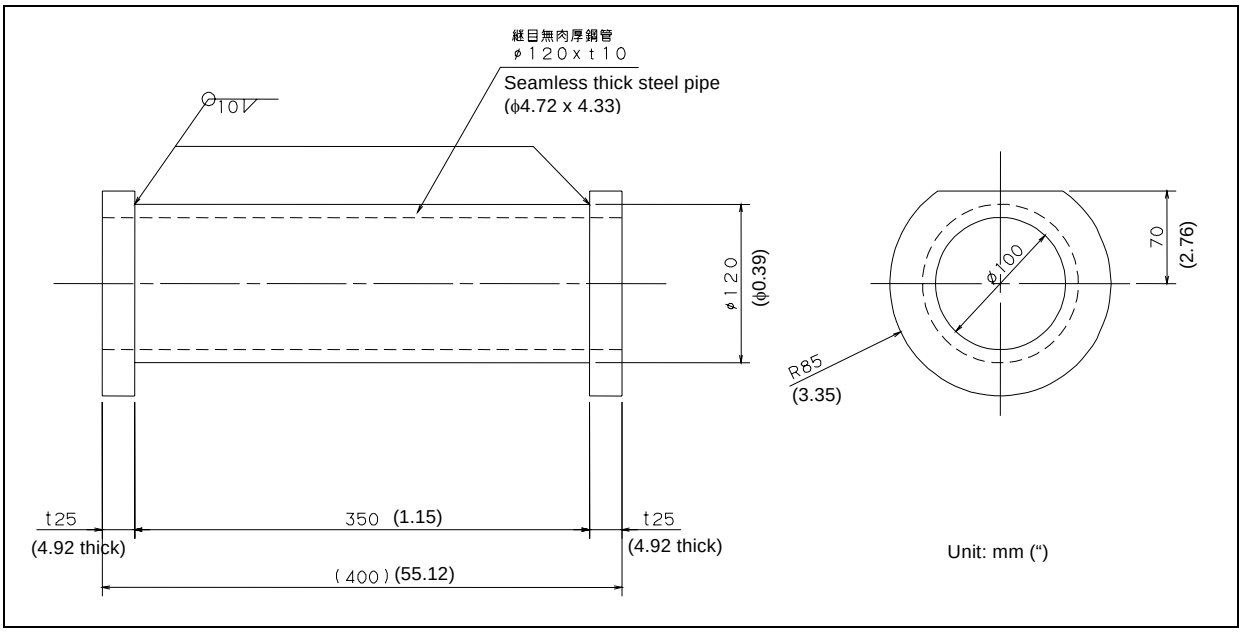


Fig. 10-2 Fixture

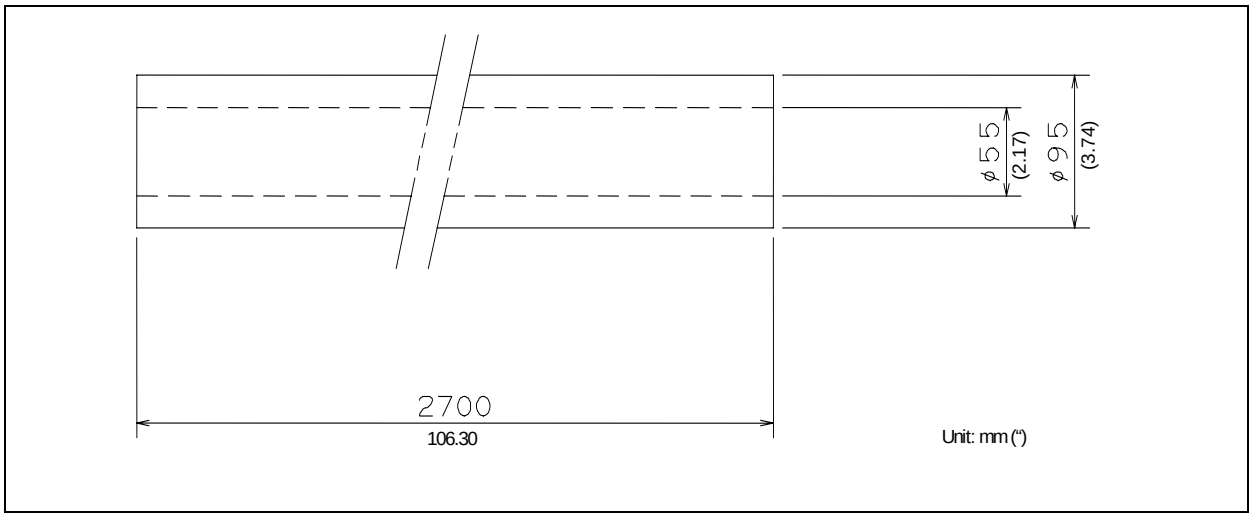


Fig. 10-3 Pipe

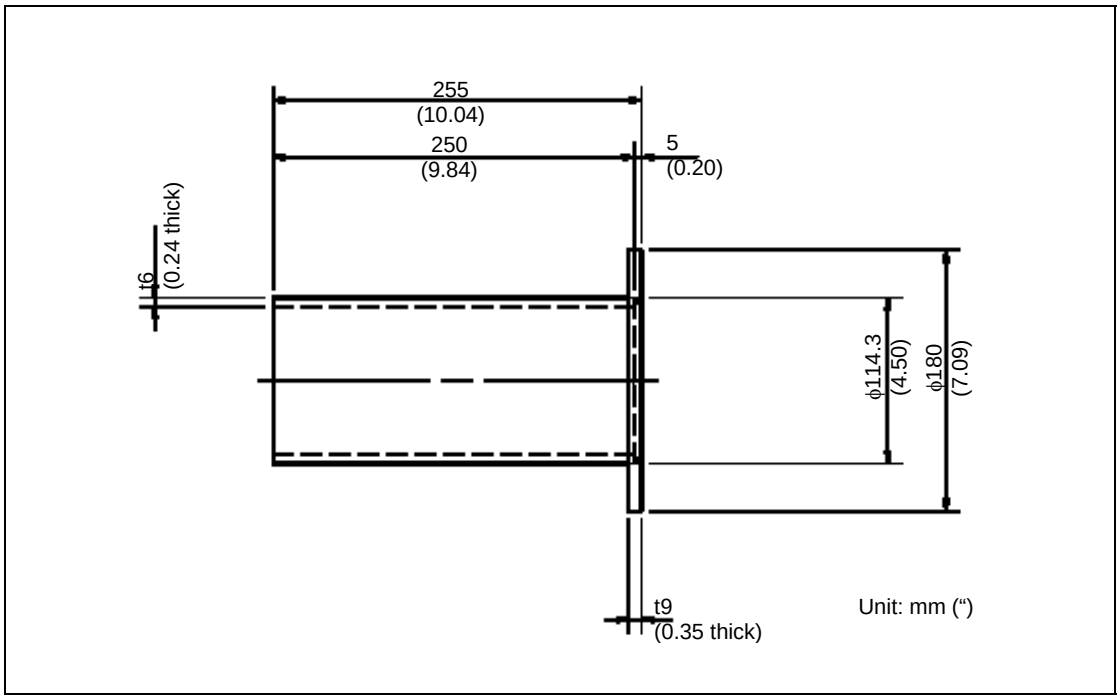


Fig. 10-4 Pipe

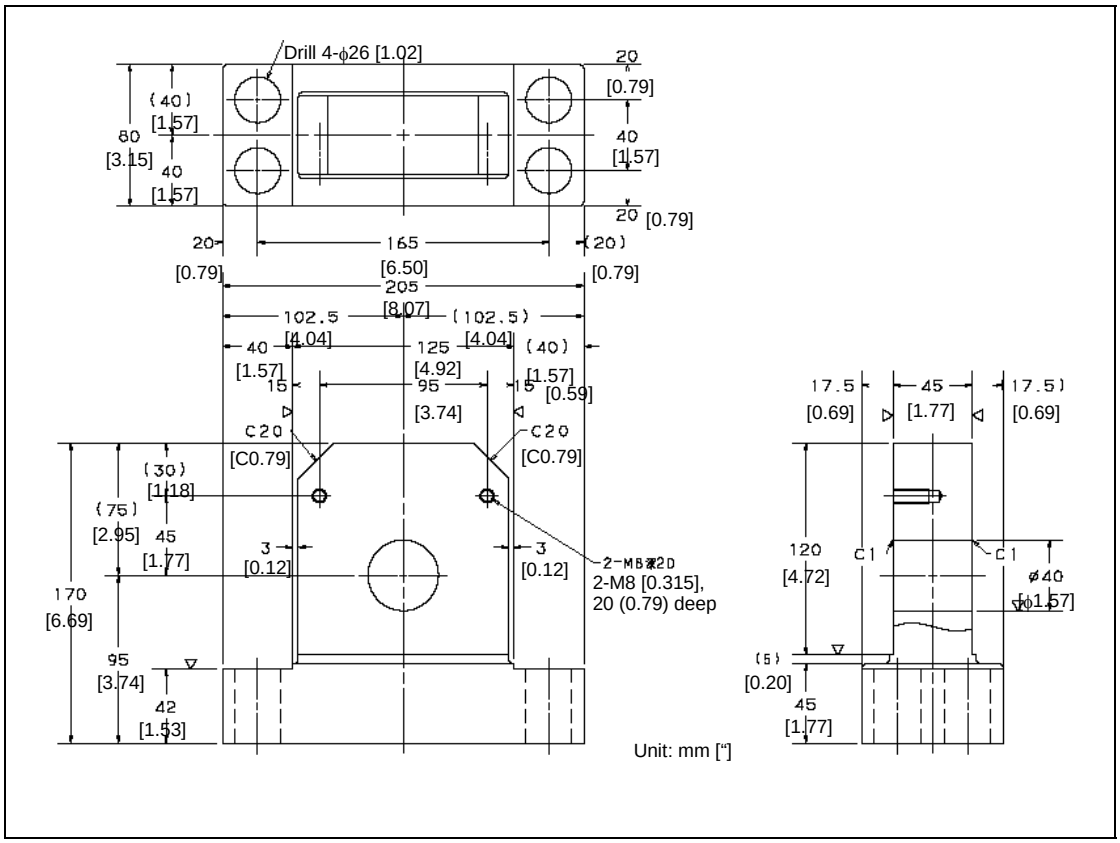


Fig. 10-5 Bracket

- MEMO -